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Teledyne Geotech

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SEISMIC DATA LABORATORY

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13 ABSTRACT

An analysis of 418 small-event ($m_b \leq 5.8$) seismograms recorded at 17 world-wide stations, and of 148 large-event (m_b, M_s (NOS), or M_s from Pasadena or Berkeley ≥ 7.0) seismograms recorded at 8 world-wide stations and TFO indicates that coda shape is primarily a function of the arrival times and relative amplitudes of significant secondary arrivals. However, for times greater than 10 to 20 seconds into the coda, large-event codas are approximately 0.14 m_b units greater in amplitude at any given time relative to their maxima, than the corresponding relative amplitude for small-event codas. This suggests that large events are, in fact, multiple events, with the nominal period of source activity for a given sequence estimated to be on the order of 1 to 2 minutes. Correspondingly, large events also tend to be emergent, displaying a 0.2 to 0.3 m_b increase in amplitude between 5 and 30 seconds into the P-wave arrival over that observed in the first 5 seconds of the

14 KEY WORDS

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Coda Prediction

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AVERAGE P AND PKP CODAS FOR EARTHQUAKES

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INTRODUCTION

In a previous report (Cohen et al., 1972), P and PKP coda characteristics were examined for events from 15 seismic regions as recorded at 17 World Wide Standard Seismograph Stations (WWSSS). These coda characteristics were determined by taking amplitude measurements in successive time windows (0-5, 5-10, 10-20, 20-30, 30-40, 40-50, 50-60 seconds; 1-2, 2-3, ...minutes), scaling these measurements relative to the largest excursion in the coda, and connecting successive observations to obtain the coda envelope. The study yielded two important conclusions:

1. Coda characteristics are determined primarily by the arrival times and relative amplitudes of significant secondary phases;

2. Coda characteristics determined for events in the range $6.0 \gtrsim m_b \gtrsim 6.5$ appear applicable to events with $5.0 \gtrsim m_b \gtrsim 6.0$.

In the present report, data from Cohen et al. (1972) are reprocessed to yield average P and PKP coda determinations from specific distance intervals between 0 to 180°. These determinations are then compared to similar observations for large events (m_b or $M_s \geq 7.0$). The results suggest that coda decay is a function of magnitude. That is, while <u>coda shape</u> is a function of the arrival times and relative amplitudes of significant secondary arrivals, the greater the event magnitude, the higher is the <u>relative amplitude level</u> at a given time in the coda after the first 10-20 seconds.

For the data examined, and for elapsed times greater than 10-20 seconds, large-event codas are about 0.14 m_b units higher in relative amplitude than corresponding relative amplitudes in small-event codas. One explanation for the observed increase appears to be that large events may be designated as multiple events, with source activity lasting up to 1 or 2 minutes. That elevated coda are observed for these events, then, may be due to the fact that the later events in the sequence extend the duration of the arrival of principal phases. This retards coda decay, in effect elevating the relative amplitude above which would be observed for a single event of equal maximum amplitude. Because large and small events do exhibit different coda characteristics, at least two sets of average coda determinations are required for coda prediction. Two such sets are presented in this report, together with the corresponding standard deviations of the individual coda observations. Further, the set of coda determinations for small events is used to predict the coda for the San Fernando earthquake of 9 February 1971, at 43 stations. In general, the observed coda at a given station lies within one standard deviation of the predicted coda.

ANALYSIS TECHNIQUES

The method used to determine coda decay characteristics is shown in Figure 1. Amplitude measurements, scaled relative to the largest excursion in the P or PKP coda, were made in a specified set of successive time windows, continuing until the coda decayed into the pre-existing ambient noise level, or until the arrival of surface waves.

Surface waves were excluded from the present work for the following reason: these arrivals have periods on the short-period record of the order of 1 to 3 seconds, and sometimes greater. Thus, despite the high amplitude of the surface wave arrival, the arrival from another earthquake or an explosion may be distinguishable in the surface-wave background due to its shorter period. As coda determinations are most often used to determine how often signals from one event are masked in the coda of another event, use of coda characteristics incorporating surface wave determinations will lead one to overestimate the number of events masked. Hence, our primary concern here is with the P and PKP coda decay characteristics.

Having determined the principal coda maxima, these values were next plotted on log-linear paper and the coda envelope obtained by connecting successive determinations. For example, a set of coda measurements yielded the coda envelope shown in Figure 2a. Using the coda measurements made at a given station for a suite of events from the given region, we obtained the

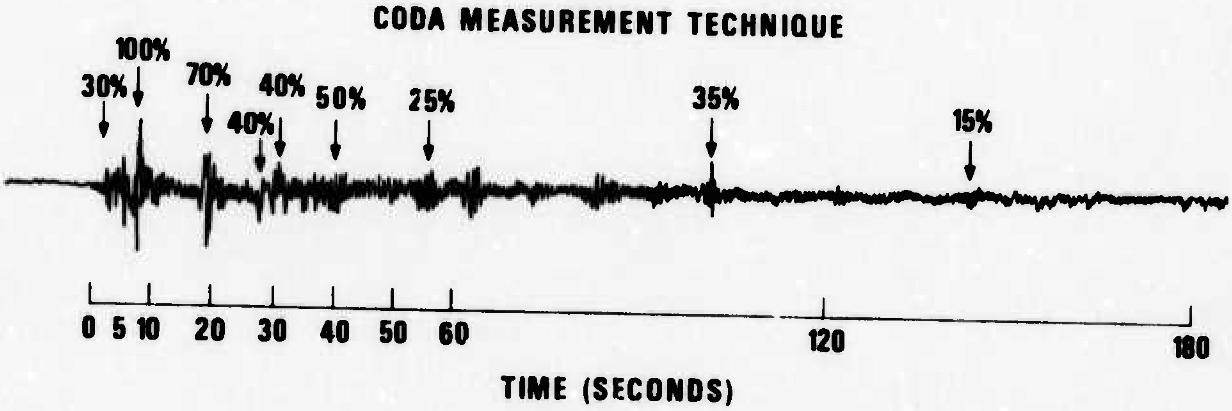


Figure 1. Coda measurement technique.

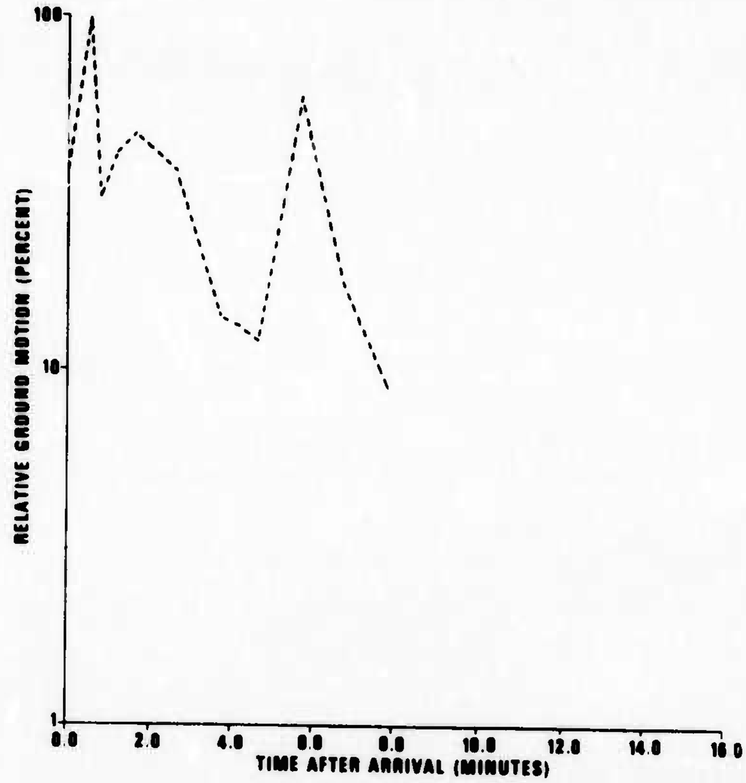
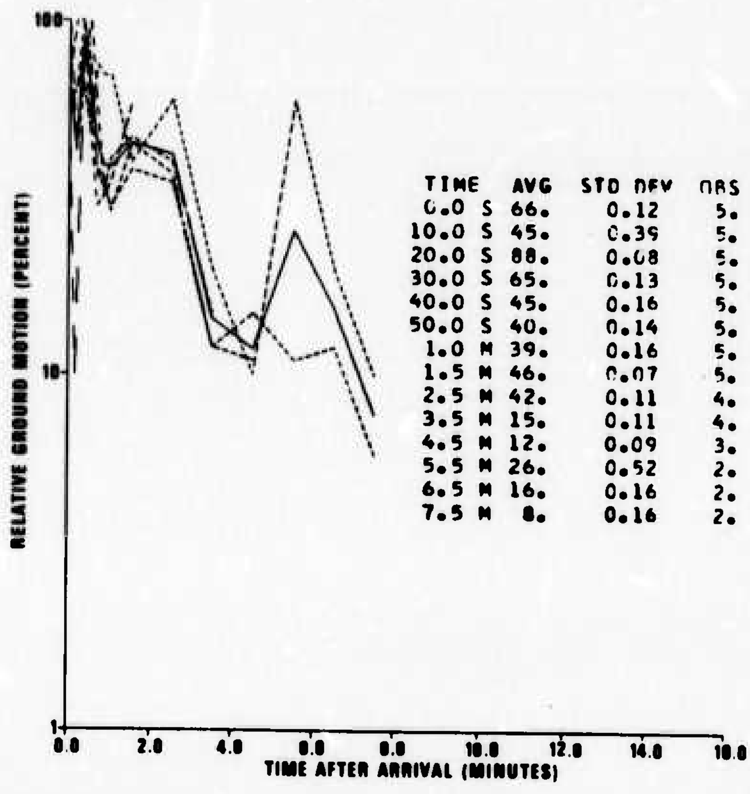


Figure 2a. Single Coda determination.



TIME		AVG	STD DEV	OBS
0.0	S	66.	0.12	5.
10.0	S	45.	0.39	5.
20.0	S	88.	0.08	5.
30.0	S	65.	0.13	5.
40.0	S	45.	0.16	5.
50.0	S	40.	0.14	5.
1.0	M	39.	0.16	5.
1.5	M	46.	0.07	5.
2.5	M	42.	0.11	4.
3.5	M	15.	0.11	4.
4.5	M	12.	0.09	3.
5.5	M	26.	0.52	2.
6.5	M	16.	0.16	2.
7.5	M	8.	0.16	2.

Figure 2b. Determination of the average coda decay characteristics from a set of coda observations.

data shown in Figure 2b. The average coda was then determined and a statistic associated with the spread in data.

While the above technique yielded representative coda for events from a given region as recorded at a given station (as reported by Cohen et al. 1972), the observation that coda characteristics are determined primarily by the arrival times and relative amplitudes of significant secondary phases suggests that average coda characteristics are better determined by combining a suite of world-wide coda observations grouped by distance. That is, because the coda determinations are taken in specific time windows following the P or PKP arrival, codas should be grouped (classified) according to the specific windows in which the more important secondary phases are observed. We would prefer, for example, to consider as a group those coda for which the PP phase arrives between 1 and 2 minutes after the P arrival, and for which the PcP phase arrives between 2 and 3 minutes after P onset. The corresponding distance range is $31° \leq \Delta \leq 42°$. The standard surface focus travel-time tables for body phases, considering only the arrival times of PP and PcP relative to P, yields the distance intervals shown in Table I. Within each interval, the PP and PcP arrival times relative to P remain fixed in a given time window. A similar analysis performed for distances beyond 105° for PKP yields the intervals shown in Table II. Here, the significant secondary

TABLE I

P-Coda Distance Intervals

1.	0 - 5°
2.	5 - 10°
3.	10 - 14°
4.	14 - 16°
5.	16 - 21°
6.	21 - 22°
7.	22 - 24°
8.	24 - 26°
9.	26 - 29°
10.	29 - 31°
11.	31 - 42°
12.	42 - 53°
13.	53 - 56°
14.	56 - 59°
15.	59 - 63°
16.	63 - 67°
17.	67 - 72°
18.	72 - 79°
19.	79 - 84°
20.	84 - 98°
21.	98 - 103°
22.	103 - 105°
23.	105 - 110°

TABLE II

PKP-Coda Distance Intervals

1.	105 - 110°
2.	110 - 115°
3.	115 - 118°
4.	118 - 127°
5.	127 - 136°
6.	136 - 140°
7.	140 - 145°
8.	145 - 155°
9.	155 - 166°
10.	166 - 180°

phases taken into consideration are PP, PS, and PKP_2, with the reference arrival being either PKIKP or PKP_1. The number of PKP distance intervals has been minimized by ignoring time-window changes for the PP phase where this phase becomes weak. In the case of PKP_2, the relative time-of-arrival intervals used for selecting the distance intervals were 0-30 seconds, 30-60 seconds, and 1-2 minutes.

RESULTS

Coda Characteristics as a Function of Magnitude

In the first phase of this study we seek to determine what dependence, if any, coda characteristics have on event magnitude.

Let us define a "large" event as one having an NOS m_b, NOS M_s, or secondary m_b (at an observatory such as Pasadena or Berkeley) of 7.0 or larger. By this definition, the events listed in Tables III and IV constitute a large-event population. Pertinent station information for this data set are given in Table V. Grouping the events by the distance intervals given in Tables I and II, and averaging over the individual coda determinations, we obtain the average coda determinations shown in black in Appendix I. The dashed black lines show the 95% confidence intervals on the average coda determinations. These determinations must now be compared to similar observations for "small" events.

It would be convenient to define a "small" event as one with m_b, M_s and secondary m_b less than 7.0. Unfortunately, most of the data used by Cohen et al. (1972) were for events in a time frame when M_s and secondary m_b determinations were not made by NOS or reported to NOS on a routine basis. Thus, an examination was made of all events which occurred between 1 January 1967 and 22 May 1972, and which had an M_s of 6.5 or larger. We found that of the 46 events listed with $m_b \leq 5.8$ and with M_s values available,

TABLE 111

Large-Event Information, 42 to 103° Distance
(Listed by Event)

DATE	ORIGIN TIME Hr	Min	Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	NOS M_s	SEC m_b	SEC m_b SOURCE	AREA LOCATION	CHG	COL	COP	KON	MAT	PEL	PRE	SHI	TFO
04 Jan 70	17	00	40.2	24.1N	102.5E	31	5.9	7.5	7.5	PAS	Yunan, China		76°	70°	71°			87°	47°	
08 Jan 70	17	12	39.1	34.7S	178.6E	179	6.1		7.0	PAS	Kermadec Is.	92°					86°			95°
10 Jan 70	12	07	08.6	6.8N	126.7E	73	6.1		7.3	PAS	Philippines		82°							
20 Jan 70	07	19	51.2	25.8S	177.3W	80	6.5		7.3	PAS	Tonga Is.-Fiji Is.		93°				89°			87°
28 Feb 70	10	52	31.2	52.7N	175.1W	162	6.1		7.0	PAS	Aleutian Is.			72°	68°				88°	48°
28 Mar 70	21	02	23.4	39.2N	29.5E	20	6.0	7.1	7.3	PAS	Turkey		76°					65°		98°
7 Apr 70	05	34	05.6	15.8N	121.7E	37	6.4	7.3	7.5	PAS	Philippines		76°	88°	87°			100°		
12 Apr 70	04	01	44.0	15.1N	122.1E	24	5.9	7.0	7.0	PAS	Philippines		77°	88°	88°			100°	65°	
29 Apr 70	14	01	32.8	14.5N	92.6W	33	5.8	7.3	7.0	PAS	Mexico				84°		52°			
27 May 70	12	05	06.0	27.2N	140.1E	382	6.2		7.1	PAS	Bonin Is.				84°					89°
31 May 70	20	23	27.3	9.2S	78.8W	43	6.6	7.8	7.6	PAS	Peru			98°	97°					53°
11 Jun 70	16	46	38.3	59.1S	157.8E	33	5.8	7.2	7.0	PAS	Macquarie Is.					97°	80°	86°		
15 Jun 70	11	14	52.4	54.3S	63.6W	33	5.6	7.0	7.0	PAS	Falkland Is.							70°		97°
24 Jun 70	13	09	08.3	51.8N	131.0W	12	5.6	7.0	6.5	PAS	Queen Charlotte Is.	97°		69°		63°			99°	
25 Jul 70	22	41	10.7	32.2N	131.7E	34	6.1	7.0	6.8	PAS	Japan		57°	78°	77°				66°	91°
31 Jul 70	17	08	05.4	1.5S	72.6W	651	7.1		7.0	BRK	Colombia									51°
11 Aug 70	10	22	20.6	14.1S	166.7E	33	6.2	7.0	7.5	BRK	New Hebrides	74°	86°			57°				91°
30 Aug 70	17	46	09.0	52.4N	151.6E	645	6.6		7.2	PAS	Sea of Okhotsk			67°						68°
31 Oct 70	17	53	09.3	4.9S	145.5E	42	6.0	7.0	7.0	PAS	New Guinea								95°	
02 Dec 70	15	54	19.9	11.0S	163.3E	33	5.8	7.0	6.6	BRK	Solomon Is.	70°	84°							92°
10 Dec 70	04	34	38.8	4.0S	80.7W	25	6.3	7.6	7.1	BRK	Peru-Ecuador			95°	94°					48°
03 Jan 71	17	35	40.2	55.5S	2.6W	33	6.4	7.1	6.9	BRK	So. Atlantic Ridge								97°	
04 Feb 71	15	33	28.6	.7S	98.8E	33	6.3	7.1	6.7	PAS	Sumatra			89°						
02 May 71	06	08	27.3	51.4N	177.2W	43	6.0	7.1	6.8	PAS	Aleutian Is.			73°					88°	49°
17 Jun 71	21	00	40.9	25.5S	69.2W	93	6.3		7.0	PAS	Chile									77°
09 Jul 71	03	03	18.7	32.5S	71.2W	58	6.6		7.5	PAS	Chile									77°
14 Jul 71	06	11	29.1	5.5S	153.9E	47		7.9	7.8	BRK	New Britain Is.									97°
19 Jul 71	00	14	45.3	5.7S	153.8E	42	5.8	7.1	6.5	PAS	New Britain Is.					45°				97°
26 Jul 71	01	23	21.3	4.9S	153.2E	48	6.3	7.9			New Ireland Is.								102°	97°
27 Jul 71	02	02	49.6	2.7S	77.4W	125	6.3		7.5	PAS	Peru-Ecuador									48°
02 Aug 71	07	24	56.8	41.4N	143.5E	51	6.6		7.0	PAS	Japan			75°						78°
05 Aug 71	01	58	51.7	.9S	22.1W	33	6.3	7.0	7.0	PAS	Mid-Atlantic Ridge			63°	65°				77°	90°
05 Sep 71	18	35	25.0	46.5N	141.2E	9	6.3	7.1	6.8	BRK	Sakhalin Is.			69°					68°	76°
14 Sep 71	05	20	29.3	6.5S	151.5E	33	6.1	6.3	7.1	BRK	New Britain Is.					45°			101°	100°
21 Nov 71	05	57	11.9	11.8S	166.5E	115	6.4		7.1	PAS	Santa Cruz Is.					55°				90°
24 Nov 71	19	35	29.1	52.9N	159.2E	106	6.3		7.5	BRK	Kamchatka									63°
15 Dec 71	08	29	55.3	56.0N	163.3E	33	6.1	7.8	7.3	PAS	Kamchatka			66°						60°

TABLE IV

Large-Event Information, 42 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
42-53°								
04 Jan 70	17 00 40.2	24.1N	102.5E	31	5.9	SHI	47°	Yunan, China
28 Feb 70	10 52 31.2	52.7N	175.1W	162	6.1	TFO	48°	Aleutian Is.
29 Apr 70	14 01 32.8	14.5N	92.6W	33	5.8	PEL	52°	Mexico
31 Jul 70	17.08 05.4	1.5S	72.6W	651	7.1	TFO	51°	Columbia
10 Dec 70	04 34 38.8	4.0S	80.7W	25	6.3	TFO	48°	Peru-Ecuador Border
02 May 71	06 08 27.3	51.4N	177.2W	43	6.0	TFO	49°	Aleutian Is.
19 Jul 71	00 14 45.3	5.7S	153.8W	42	5.8	MAT	45°	New Ireland Area
27 Jul 71	02 02 49.6	2.7S	77.4W	125	6.3	TFO	48°	Peru-Ecuador Border
14 Sep 71	05 20 29.3	6.5S	151.5E	33	6.1	MAT	45°	New Britain Area
53-56°								
31 May 70	20 23 27.3	9.2S	78.8W	43	6.6	TFO	53°	Peru
21 Nov 71	05 57 11.9	11.8S	166.5E	115	6.4	MAT	55°	Santa Cruz Is.
56-59°								
25 Jul 70	22 41 10.7	32.2N	131.7E	34	6.1	COL	57°	Japan
11 Aug 70	10 22 20.0	14.1S	166.7E	33	6.2	MAT	57°	New Hebrides
59-63°								
24 Jun 70	13 09 08.3	51.8N	131.0W	12	5.6	MAT	63°	Queen Charlotte Is.
05 Aug 71	01 58 51.7	.9S	22.1W	33	6.3	COP	63°	Mid-Atlantic Ridge
24 Nov 71	19 35 29.1	52.9N	159.2E	106	6.3	TFO	63°	Kamchatka
15 Dec 71	08 29 55.3	56.0N	163.3E	33	6.1	TFO	60°	Kamchatka
63-67°								
28 Mar 70	21 02 23.4	39.2N	29.5E	20	6.0	PRE	65°	Turkey
12 Apr 70	04 01 44.0	15.1N	122.1E	24	5.9	SHI	65°	Philippines
25 Jul 70	22 41 10.7	32.2N	131.7E	34	6.1	SHI	66°	Japan
30 Aug 70	17 46 09.0	52.4N	151.6E	645	6.6	COP	67°	Sea of Okhotsk
05 Aug 71	01 58 51.7	.9S	22.1W	33	6.3	KON	65°	Mid-Atlantic Ridge
15 Dec 71	08 29 55.3	56.0N	163.3E	33	6.1	COP	66°	Kamchatka

TABLE IV (Cont'd.)

Large-Event Information, 42 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
67-72°								
04 Jan 70	17 00 40.2	24.1N	102.5E	31	5.9	COP	70°	Yunan, China
04 Jan 70	17 00 40.2	24.1N	102.5E	31	5.9	KON	71°	Yunan, China
28 Feb 70	10 52 31.2	52.7N	175.1W	162	6.1	COP	72°	Aleutian Is.
28 Feb 70	10 52 31.2	52.7N	175.1W	162	6.1	KON	68°	Aleutian Is.
15 Jun 70	11 14 52.4	54.3S	63.6W	33	5.6	PRE	70°	Falkland Is.
24 Jun 70	13 09 08.3	51.8N	131.0W	12	5.6	COP	69°	Queen Charlotte Is.
30 Aug 70	17 46 09.0	52.4N	151.6E	645	6.6	TFO	68°	Sea of Okhotsk
02 Dec 70	15 54 19.9	11.0S	163.3E	33	5.8	CHG	70°	Solomon Is.
17 Jun 71	21 00 40.9	25.5S	69.2W	93	6.3	TFO	72°	Chile
05 Sep 71	18 35 25.0	46.5N	141.2E	9	6.3	COP	69°	Sakhalin Is.
05 Sep 71	18 35 25.0	46.5N	141.2E	9	6.3	SHI	68°	Sakhalin Is.
72-79°								
04 Jan 70	17 00 40.2	24.1N	102.5E	31	5.9	COL	76°	Yunan, China
28 Mar 70	21 02 23.4	39.2N	29.5E	20	6.0	COL	76°	Turkey
07 Apr 70	05 34 05.6	15.8N	121.7E	37	6.4	COL	76°	Luzon, Philippines
12 Apr 70	04 01 44.0	15.1N	122.1E	24	5.9	COL	77°	Philippines
25 Jul 70	22 41 10.7	32.2N	131.7E	34	6.1	KON	77°	Japan
25 Jul 70	22 41 10.7	32.2N	131.7E	34	6.1	COP	78°	Japan
11 Aug 70	10 22 20.0	14.1S	166.7E	33	6.2	CHG	74°	New Hebrides
02 May 71	06 08 27.3	51.4N	177.2W	43	6.0	COP	73°	Aleutian Is.
09 Jul 71	03 03 18.7	32.5S	71.2W	58	6.6	TFO	77°	Chile
02 Aug 71	07 24 56.8	41.4N	143.5E	51	6.6	COP	75°	Japan
02 Aug 71	07 24 56.8	41.4N	143.5E	51	6.6	TFO	78°	Japan
05 Aug 71	01 58 51.7	.9S	22.1W	33	6.3	SHI	77°	Mid-Atlantic Ridge
05 Sep 71	18 35 25.0	46.5N	141.2E	9	6.3	TFO	76°	Sakhalin Is.
79-84°								
10 Jan 70	12 07 08.6	6.8N	126.7E	73	6.1	COL	82°	Philippines
19 Apr 70	14 01 32.8	14.5N	92.6W	33	5.8	KON	84°	Mexico
27 May 70	12 05 06.0	27.2N	140.1E	382	6.2	KON	84°	Bonin Is.
11 Jun 70	16 46 38.3	59.1S	157.8E	33	5.8	PEL	80°	Macquarie Is.
02 Dec 70	15 54 19.9	11.0S	163.3E	33	5.8	COL	84°	Solomon Is.

TABLE IV (Cont'd.)

Large-Event Information, 42 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	Depth (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
84-98°								
08 Jan 70	17 12 39.1	34.7S	178.6E	179	6.1	CHG	92°	Kermadec Is.
24 Jun 70	13 09 08.3	51.8N	131.0W	12	5.6	CHG	97°	Queen Charlotte Is.
20 Jan 70	07 19 51.2	25.8S	177.3W	80	6.5	COL	93°	Tonga Is. - Fiji Is.
11 Aug 70	10 22 20.0	14.1S	166.7E	33	6.2	COL	86°	New Hebrides
07 Apr 70	05 34 05.6	15.8N	121.7E	37	6.4	COP	88°	Luzon, Philippines
12 Apr 70	04 01 44.0	15.1N	122.1E	24	5.9	COP	88°	Philippines
10 Dec 70	04 34 38.8	4.0S	80.7W	25	6.3	COP	95°	Peru-Ecuador Border
07 Apr 70	05 34 05.6	15.8N	121.7E	37	6.4	KON	87°	Luzon, Philippines
12 Apr 70	04 01 44.0	15.1N	122.1E	24	5.9	KON	88°	Philippines
31 May 70	20 23 27.3	9.2S	78.8W	43	6.6	KON	97°	Peru
10 Dec 70	04 34 38.8	4.0S	80.7W	25	6.3	KON	94°	Peru-Ecuador Border
11 Jun 70	16 46 38.3	59.1S	157.8E	33	5.8	MAT	97°	Macquarie Is.
08 Jan 70	17 12 39.1	34.7S	178.6E	179	6.1	PEL	86°	Kermadec Is.
20 Jan 70	07 19 51.2	25.8S	177.3W	80	6.5	PEL	89°	Tonga Is. - Fiji Is.
04 Jan 70	17 00 40.2	24.1N	102.5E	31	5.9	PRE	87°	Yunan, China
11 Jun 70	16 46 38.3	59.1S	157.8E	33	5.8	PRE	86°	Macquarie Is.
28 Feb 70	10 52 31.2	52.7N	175.1W	162	6.1	SHI	88°	Aleutian Is.
31 Oct 70	17 53 09.3	4.9S	145.5E	42	6.0	SHI	95°	New Guinea
08 Jan 70	17 12 39.1	34.7S	178.6E	179	6.1	TFO	95°	Kermadec Is.
20 Jan 70	07 19 51.2	25.8S	177.3W	80	6.5	TFO	87°	Tonga Is. - Fiji Is.
27 May 70	12 05 06.0	27.2N	140.1E	382	6.2	TFO	89°	Bonin Is.
15 Jun 70	11 14 52.4	54.3S	63.6W	33	5.6	TFO	97°	Falkland Is.
25 Jul 70	22 41 10.7	32.2N	131.7E	34	6.1	TFO	91°	Japan
11 Aug 70	10 22 20.0	14.1S	166.7E	33	6.2	TFO	91°	New Hebrides
02 Dec 70	15 54 19.9	11.0S	163.3E	33	5.8	TFO	92°	Solomon Is.
04 Feb 71	15 33 28.6	.7S	98.8E	33	6.3	COP	89°	Northern Sumatra
03 Jan 71	17 35 40.2	55.5S	2.6W	33	6.4	SHI	97°	South Atlantic Ridge
02 May 71	06 08 27.3	51.4N	177.2W	43	6.0	SHI	88°	Aleutian Is.
14 Jul 71	06 11 29.1	5.5S	153.9E	47	*7.8	TFO	97°	New Ireland Area
19 Jul 71	00 14 45.3	5.7S	153.8E	42	5.8	TFO	97°	New Ireland Area
26 Jul 71	01 23 21.3	4.9S	153.2E	48	6.3	TFO	97°	New Ireland Area
05 Aug 71	01 58 51.7	.9S	22.1W	33	6.3	TFO	90°	Mid-Atlantic Ridge
21 Nov 71	05 57 11.9	11.8S	166.5E	115	6.4	TFO	90°	Santa Cruz Is.

* m_b Authority BRK

TABLE IV (Cont'd.)

Large-Event Information, 42 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	Depth (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
98-103°								
31 May 70	20 23 27.3	9.2S	78.8W	43	6.6	COP	98°	Peru
07 Apr 70	05 34 05.6	15.8N	121.7E	37	6.4	PRE	100°	Luzon, Philippines
12 Apr 70	04 01 44.0	15.1N	122.1E	24	5.9	PRE	100°	Philippines
24 Jun 70	13 09 08.3	51.8N	131.0W	12	5.6	SHI	99°	Queen Charlotte Is.
28 Mar 70	21 02 23.4	39.2N	29.5E	20	6.0	TFO	98°	Turkey
26 Jul 71	01 23 21.3	4.9S	153.2E	48	6.3	SHI	102°	New Ireland Area
14 Sep 71	05 20 29.3	6.5S	151.5E	33	6.1	SHI	101°	New Britain Area
14 Sep 71	05 20 29.3	6.5S	151.5E	33	6.1	TFO	100°	New Britain Area
103-105°								
08 Jan 70	17 12 39.1	34.7S	178.6E	179	6.1	COL	103°	Kermadec Is.
31 Oct 70	17 53 09.3	4.9S	145.5E	42	6.0	TFO	104°	New Guinea
14 Jul 71	06 11 29.1	5.5S	153.9E	47	*7.8	SHI	103°	New Britain
19 Jul 71	00 14 45.3	5.7S	153.8E	42	5.8	SHI	103°	New Britain
08 Feb 71	21 04 21.8	63.5S	61.2W	33	6.3	TFO	105°	South Shetland Is.
105-110°								
12 Apr 70	04 01 44.0	15.1N	122.1E	24	5.9	TFO	109°	Philippines
10 Jan 71	07 17 03.7	3.1S	139.7E	33	7.3	TFO	107°	New Guinea
110-115°								
04 Jan 70	17 00 40.2	24.1N	102.5E	31	5.9	TFO	113°	Yunan, China
08 Jan 70	17 12 39.1	34.7S	178.6E	179	6.1	PRE	113°	Kermadec Is.
10 Jan 70	12 07 08.6	6.8N	126.7E	73	6.1	TFO	112°	Philippines
07 Apr 70	05 34 05.6	15.8N	121.7E	37	6.4	TFO	110°	Luzon, Philippines
29 Apr 70	14 01 32.8	14.5N	92.6W	33	5.8	MAT	110°	Mexico
02 Dec 70	15 54 19.9	11.0S	163.3E	33	5.8	SHI	113°	Solomon Is.
10 Jan 71	07 17 03.7	3.1S	139.7E	33	7.3	COP	113°	New Guinea
09 Jul 71	03 03 18.7	32.5S	71.2W	58	6.6	COP	113°	Chile
115 118°								
28 Mar 70	21 02 23.4	39.2N	29.5E	20	6.0	PEL	117°	Turkey
11 Aug 70	10 22 20.0	14.1S	166.7E	33	6.2	SHI	118°	New Hebrides
21 Nov 71	05 57 11.9	11.8S	166.5E	115	6.4	SHI	117°	Santa Cruz Is.

* m_b Authority BRK

TABLE IV (Cont'd.)

Large-Event Information, 42 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
118-127°								
20 Jan 70	07 19 51.2	25.8S	117.3W	80	6.5	PRE	123°	Tonga Is. - Fiji Is.
29 Apr 70	14 01 32.8	14.5N	92.6W	33	5.8	PRE	124°	Mexico
29 Apr 70	14 01 32.8	14.5N	92.6W	33	5.8	SHI	125°	Mexico
27 May 70	12 05 06.0	27.2N	140.1E	382	6.2	PRE	120°	Bonin Is.
11 Jun 70	16 46 38.3	59.1S	157.8E	33	5.8	TFO	119°	Macquarie Is.
15 Jun 70	11 14 52.4	54.3S	63.6W	33	5.6	COP	126°	Falkland Is.
08 Feb 71	21 04 21.8	63.5S	61.2W	33	6.3	SHI	127°	South Shetland Is.
02 May 71	06 08 27.3	51.4N	177.2W	43	6.0	PEL	125°	Aleutian Is.
14 Jul 71	06 11 29.1	5.5S	153.9E	47	*7.8	COP	121°	New Ireland Area
19 Jul 71	00 14 45.3	5.7S	153.8E	42	5.8	PEL	123°	New Ireland Area
26 Jul 71	01 23 21.3	4.9S	153.2E	48	6.3	COP	120°	New Ireland Area
26 Jul 71	01 23 21.3	4.9S	153.2E	48	6.3	PEL	124°	New Ireland Area
27 Oct 71	17 58 36.9	15.5S	167.2E	40	6.0	SHI	119°	New Hebrides
127-136°								
08 Jan 70	17 12 39.1	34.7S	178.6E	179	6.1	SHI	135°	Kermadec Is.
31 May 70	20 23 27.3	9.2S	78.8W	43	6.6	SHI	130°	Peru
11 Jun 70	16 46 38.3	59.1S	157.8E	33	5.8	COL	130°	Macquarie Is.
15 Jun 70	11 14 52.4	54.3S	63.6W	33	5.6	COL	135°	Falkland Is.
15 Jun 70	11 14 52.4	54.3S	63.6W	33	5.6	SHI	129°	Falkland Is.
11 Aug 70	10 22 20.0	14.1S	166.7E	33	6.2	COP	134°	New Hebrides
11 Aug 70	10 22 20.0	14.1S	166.7E	33	6.2	KON	131°	New Hebrides
10 Dec 70	04 34 38.8	4.0S	80.7W	25	6.3	MAT	132°	Peru-Ecuador Border
10 Dec 70	04 34 38.8	4.0S	80.7W	25	6.3	SHI	129°	Peru-Ecuador Border
03 Jan 71	17 35 40.2	55.5S	2.6W	33	6.4	TFO	128°	South Atlantic Ridge
10 Jan 71	07 17 03.7	3.1S	139.7E	33	7.3	PEL	134°	New Guinea
08 Feb 71	21 04 21.8	63.5S	61.2W	33	6.3	COP	132°	South Shetland Is.
17 Jun 71	21 00 40.9	25.5S	69.2W	93	6.3	SHI	129°	Chile
09 Jul 71	03 03 18.7	32.5S	71.2W	58	5.6	SHI	132°	Chile
27 Oct 71	17 58 36.9	15.5S	167.2E	40	6.0	COP	135°	New Hebrides
21 Nov 71	05 57 11.9	11.8S	166.5E	115	6.4	COP	132°	Santa Cruz Is.

* m_b Authority BRK

TABLE IV (Cont'd.)

Large-Event Information, 42 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
136-140°								
20 Jan 70	07 19 51.2	25.8S	177.3W	80	6.5	SHI	136°	Tonga Is. - Fiji Is.
04 Feb 71	15 33 28.6	.7S	98.8E	33	6.3	TFO	136°	Northern Sumatra
05 Aug 71	01 58 51.7	.9S	22.1W	33	6.3	MAT	140°	Mid-Atlantic Ridge
140-145°								
29 Apr 70	14 01 32.8	14.5N	92.6W	33	5.8	CHG	145°	Mexico
15 Jun 70	11 14 52.4	54.3S	63.6W	33	5.6	CHG	142°	Falkland Is.
04 Feb 71	15 33 28.6	.7S	98.8E	33	6.3	PEL	145°	Northern Sumatra
145-155°								
08 Jan 70	17 12 39.1	34.7S	178.6E	179	6.1	KON	154°	Kermadec Is.
20 Jan 70	07 19 51.2	25.8S	177.3W	80	6.5	COP	149°	Tonga Is. - Fiji Is.
20 Jan 70	07 19 51.2	25.8S	177.3W	80	6.5	KON	146°	Tonga Is. - Fiji Is.
24 Jun 70	13 09 08.3	51.8N	131.0W	12	5.6	PRF	150°	Queen Charlotte Is.
03 Jan 71	17 35 40.2	55.5S	2.6W	33	6.4	MAT	148°	South Atlantic Ridge
155-166°								
08 Jan 70	17 12 39.1	34.9S	178.6E	179	6.1	COP	157°	Kermadec Is.
12 Apr 70	04 01 44.0	15.1N	122.1E	24	5.9	PEL	158°	Philippines
11 Jun 70	16 46 38.3	59.1S	157.8E	33	5.8	COP	161°	Macquarie Is.
11 Jun 70	16 46 38.3	59.1S	157.8E	33	5.8	KON	164°	Macquarie Is.
15 Jun 70	11 14 52.4	54.3S	63.6W	33	5.6	MAT	157°	Falkland Is.
07 Apr 70	05 34 05.6	15.8N	121.7E	37	6.4	PEL	159°	Luzon, Philippines
25 Jul 70	22 41 10.7	32.2N	131.7E	34	6.1	PEL	161°	Japan

TABLE V

Station Information - Large Events

STATION	LOCATION	LATITUDE (Deg Min Sec)	LONGITUDE (Deg Min Sec)	ELEVATION (Meters)
CHG	Chiengmai, Thailand	18 47 24N	98 58 37E	416
COL	College Outpost, Alaska	64 54 00N	147 47 30W	320
COP	Copenhagen, Denmark	55 41 00N	12 26 00E	13
KON	Kongsberg, Norway	59 38 57N	9 37 55E	200
MAT	Matsushiro, Japan	36 32 18N	138 12 30E	440
PEL	Peldehue, Chile	33 08 37S	70 41 07W	690
PRE	Pretoria, South Africa	25 45 12S	23 11 24E	1333
SHI	Shiraz, Iran	29 38 18N	52 31 12E	605
TFO	Tonto Forest, Arizona	34 16 04N	111 16 13W	1609

7 events exhibited an M_s of 7.0 or larger; that is, roughly 15% of the events with $m_b \leq 5.8$ classify as "large" events. A similar analysis performed using secondary m_b data show that of 60 events with $m_b \leq 5.8$ and with secondary values available, 3 events, or 5%, have a secondary m_b of 7.0 or larger. We therefore choose to define a small event as one having an $m_b \leq$ 5.8. Using such a definition, we expect any given set of "small" events to contain no more than, and most likely considerably less than, about 15% of what we define as "large" events.

Using the above criterion for selecting "small" events, the events shown in Table VI and VII (station information given in Table VIII) were taken from the data of Cohen et al. (1972) for further coda analysis. The data selected were also required to have 8 or more coda observations (the eighth reading is taken in the second minute of the coda). Grouping by distance interval, the small-event codas were then analyzed to yield average coda determinations in the same distance intervals for which "large" event codas were analyzed; these average codas, and their corresponding 95% confidence intervals, are shown in blue in Appendix I.

The data shown in Appendix I suggest that while <u>coda shape</u> is approximately a function of the arrival times and relative amplitudes of significant secondary arrivals for both large and small events, the greater the event magnitude, the higher is the relative amplitude level for elapsed times greater than about

TABLE VI

Small-Event Information, 42° to 103° Distance

(Listed by Event)

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH (KM)	NOS m_b	AREA LOCATION	ADE	AQU	BOZ	CHG	CMC	DAL	DAV	1ST	KBL	KON	MAL	MAT	MUN	ND1	SEO	SH1	WES
12 Jan 64	12:45:51.1	31.5N	49.4E	67	5.2	Iran-Turkey				46°													
19 Aug 64	09:33:10.0	28.2N	52.6E	50	5.6	Iran-Turkey				43°											62°		
19 Aug 64	15:20:13.9	28.2N	52.7E	50	5.6	Iran-Turkey															62°		
20 Aug 64	05:39:47.7	28.2N	52.6E	52	5.5	Iran-Turkey				43°											62°		
02 Feb 65	15:56:51.0	37.5N	73.4E	33	5.8	Tadzhik-Hindu Kush			97°														
05 Apr 65	03:12:54.2	37.7N	21.8E	34	5.7	Turkey-Greece						89°											
16 Apr 65	23:22:18.6	64.7N	160.1W	5	5.8	Alaska															49°		
27 Apr 65	14:09:07.1	35.7N	23.5E	50	5.5	Turkey-Greece															78°		
04 Aug 65	08:47:12.4	13.2S	167.0E	237	5.7	Solomons-New Hebrides												57°					
11 Aug 65	18:29:40.1	59.6N	145.8W	25	5.5	Alaska												52°					
13 Aug 65	04:40:55.3	15.9W	167.5E	34	5.7	Solomons-New Hebrides												59°					
14 Aug 65	11:07:47.1	15.8S	166.8E	33	5.5	Solomons-New Hebrides												59°					
17 Aug 65	10:35:04.1	5.3N	96.2E	33	5.3	Sumatra-Java												50°				48°	
17 Aug 65	11:14:10.4	5.2S	152.6E	47	5.8	Solomons-New Hebrides												44°					
21 Aug 65	15:04:17.6	5.9S	104.2E	33	5.5	Sumatra-Java																62°	
02 Sep 65	04:26:37.3	51.9N	175.5E	31	5.6	Aleutian Islands				67°													
14 Sep 65	08:27:15.9	8.4N	126.8E	33	5.7	Philippines-Taiwan					92°												
19 Sep 65	01:26:52.5	22.1S	174.9W	33	5.4	Tonga Is-Fiji Is.												73°					
08 Oct 65	15:21:05.4	6.1S	103.8E	33	5.7	Sumatra-Java																61°	
19 Oct 65	20:48:47.4	52.3N	174.3E	48	5.6	Aleutian Islands				66°													
23 Oct 65	06:00:48.5	53.8N	165.5W	16	5.5	Aleutian Islands				78°													
02 Nov 65	15:47:24.0	4.3S	101.2E	11	5.4	Sumatra-Java												54°					
22 Nov 65	14:00:27.0	52.0N	176.1W	49	5.5	Aleutian Islands				72°													
23 Nov 65	02:17:49.4	51.4N	179.7W	48	5.6	Aleutian Islands				70°													
08 Jan 66	22:39:17.9	37.3N	138.3E	10	5.6	Japan			76°		62°												
16 Jan 66	19:44:39.5	54.9N	165.8E	15	5.6	Kamchatka-Kuriles				61°												78°	
22 Jan 66	14:27:07.9	56.8N	153.7W	33	5.8	Alaska				84°			79°			63°				85°	54°	91°	52°
24 Jan 66	07:23:07.6	29.9N	69.7E	12	5.8	Tadzhik-Hindu Kush					82°		57°			50°	61°				48°		
28 Jan 66	08:52:02.2	39.3N	73.1E	20	5.4	Tadzhik-Hindu Kush					73°							50°					
28 Jan 66	22:38:12.2	51.6N	157.0E	107	5.6	Kamchatka-Kuriles																76°	
29 Jan 66	07:52:08.8	45.8N	151.5E	33	5.1	Kamchatka-Kuriles				51°													
31 Jan 66	02:35:05.8	27.9N	99.6E	33	5.6	China-Nepal-Burma					81°												
02 Feb 66	09:20:07.5	33.9N	73.0E	26	5.3	Tadzhik-Hindu Kush												52°					
05 Feb 66	02:01:48.3	39.2N	22.0E	38	5.8	Turkey-Greece			86°		69°	89°								46°			67°
05 Feb 66	16:16:01.0	50.2N	155.1E	98	5.8	Kamchatka-Kuriles			59°			76°		78°		67°	92°			61°			79°
10 Feb 66	20:13:33.0	47.2N	150.8E	162	5.3	Kamchatka-Kuriles				51°													
13 Feb 66	10:44:41.0	26.1N	103.2E	33	5.7	China-Nepal-Burma	69°				82°			62°								44°	
18 Feb 66	19:02:51.5	44.3N	143.1E	225	5.2	Japan				45°													
28 Feb 66	02:02:13.6	43.7N	139.6E	225	5.5	Japan			71°		56°			75°									
06 Mar 66	02:10:56.8	31.6N	80.5E	35	5.4	China-Nepal-Burma					80°												

TABLE VI (Cont'd.)

Small-Event Information, 42° to 103° Distance

(Listed by Event)

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH (KM)	NOS m_b	AREA LOCATION	ADE	AQU	BOZ	CHG	CMC	DAL	DAV	IST	KBL	KON	MAL	MAT	MUN	NDI	SEO	SHI	WES
07 Mar 66	01:16:05.8	39.1N	41.7E	13	5.7	Iran-Turkey			92°		72°												
19 Mar 66	08:11:40.0	43.3N	145.8E	11	5.6	Kamchatka-Kuriles				46°													
20 Mar 66	07:47:50.2	17.0S	174.3W	117	5.7	Tonga Is.-Fiji Is.					95°												
31 Mar 66	23:38:00.5	36.4N	70.8E	200	5.6	Tadzhik-Hindu Kush			98°		76°												
09 Apr 66	02:42:08.7	9.6N	84.1W	30	5.7	Central America			43°		62°					84°							
11 Apr 66	17:17:33.8	18.4N	102.3W	72	5.7	Central America					50°					85°							
16 Apr 66	01:27:15.3	57.0N	153.6W	33	5.7	Alaska				84°		45°		82°		63°						91°	52°
20 Apr 66	16:42:03.7	41.7N	48.2E	19	5.5	Iran-Turkey			91°												59°		
09 May 66	00:42:55.6	34.5N	26.5E	33	5.5	Turkey-Greece					74°									43°	77°		73°
11 May 66	14:17:34.1	48.9N	156.2E	13	5.8	Kamchatka-Kuriles								79°								76°	
15 May 66	14:46:06.5	51.5N	178.4W	31	5.8	Aleutian Islands				71°													
04 Jun 66	05:11:54.2	36.3N	70.8E	207	5.7	Tadzhik-Hindu Kush			98°							45°							
10 Jun 66	22:41:48.5	45.1N	99.7E	33	5.1	China-Nepal-Burma					64°												
21 Jun 66	23:06:25.9	50.1N	157.8E	14	5.8	Kamchatka-Kuriles					44°					68°							78°
27 Jun 66	10:49:50.0	29.8N	80.7E	33	5.8	China-Nepal-Burma	85°									55°							
10 Jul 66	10:00:39.1	30.5S	177.8W	40	5.8	Tonga Is.-Fiji Is.			97°										56°				
01 Aug 66	19:09:55.1	29.9N	68.8E	33	5.8	Tadzhik-Hindu Kush										49°	60°	57°			48°		
01 Aug 66	20:30:57.0	29.9N	68.6E	33	5.7	Tadzhik-Hindu Kush																	99°
10 Aug 66	05:01:09.4	20.1S	175.3W	96	5.8	Tonga Is.-Fiji Is.	43°		87°	92°									62°		79°		
10 Aug 66	22:05:35.0	38.4N	69.6E	4	5.5	Tadzhik-Hindu Kush			96°														
15 Aug 66	13:36:23.7	60.4N	146.0W	9	5.3	Alaska				85°													
16 Aug 66	02:16:19.7	36.4N	70.8E	199	5.7	Tadzhik-Hindu Kush											59°						
20 Aug 66	09:32:31.7	43.1N	140.6E	161	5.8	Japan			71°		56°												
20 Aug 66	12:05:19.0	42.3N	18.6E	22	5.5	Turkey-Greece			82°	71°													
28 Aug 66	07:29:34.7	35.8S	178.5E	94	5.8	Tonga Is.-Fiji Is.				93°									51°		87°		
07 Oct 66	20:55:56.0	61.6N	150.1W	56	5.7	Alaska				83°				77°				50°		82°	55°	87°	
29 Oct 66	02:39:29.4	39.2N	21.2E	20	5.7	Turkey-Greece			86°			88°								47°			67°
12 Nov 66	12:49:43.6	41.8N	144.1E	33	5.8	Japan			70°							72°				55°		72°	90°
07 Dec 66	17:17:42.0	44.3N	151.7E	26	5.8	Kamchatka-Kuriles					51°					72°				60°		76°	85°
11 Jan 67	11:20:45.7	34.1N	45.7E	34	5.6	Iran-Turkey					77°										64°		85°
25 Jan 67	01:50:19.4	36.6N	71.6E	281	5.7	Tadzhik-Hindu Kush												52°					
07 Feb 67	14:53:13.9	56.7N	157.2W	67	5.6	Alaska												47°					
09 Feb 67	14:08:18.7	40.8N	20.3E	3	5.6	Turkey-Greece				70°	67°									48°			
20 Feb 67	15:18:39.9	33.7N	75.3E	24	5.7	Tadzhik-Hindu Kush					78°		53°			49°		51°			42°		
04 Mar 67	06:16:21.9	18.5S	175.4W	225	5.7	Tonga Is.-Fiji Is.					97°							70°					
01 May 67	07:09:00.5	39.7N	21.3E	15	5.6	Turkey-Greece			85°		68°							84°		47°	77°		66°
27 May 67	19:05:48.5	36.1N	77.8E	35	5.4	Tadzhik-Hindu Kush			98°														
21 Jun 67	18:04:49.5	64.8N	147.4W	17	5.4	Alaska												51°					
26 Jul 67	18:53:01.3	39.5N	40.4E	33	5.6	Iran-Turkey				54°								73°					
30 Jul 67	01:37:01.7	40.7N	30.4E	16	5.6	Turkey-Greece				62°	69°							79°			71°		71°

TABLE VI (Cont'd.)

Small-Event Information, 42° to 103° Distance

(Listed by Event)

DATE	ORIGIN TIME	LATITUDE	LONGITUDE	DEPTH (KM)	NOS m_b	AREA LOCATION	ADL	AQU	BOZ	CHG	CMC	DAL	DAV	IST	KBL	KON	MAL	MAT	MUN	NDI	SEO	SHI	WES
15 Aug 67	09:21:02.3	31.1N	93.7E	33	5.7	China-Nepal-Burma	78°	63°															
28 Sep 67	15:44:55.7	59.5N	147.1W	28	5.6	Alaska												52°					
03 Oct 67	18:16:03.2	10.9N	85.9W	21	5.8	Central America		90°			60°												
02 Dec 67	12:44:42.7	41.3N	20.3E	17	5.4	Turkey-Greece												84°					
10 Dec 67	12:06:50.3	40.5N	124.6W	5	5.8	California-Western US										73°	86°						
28 Mar 68	07:39:57.1	37.9N	20.9E	6	5.4	Turkey-Greece												86°			79°		
15 Jun 68	19:53:09.2	41.9N	142.7E	33	5.2	Japan									57°								
17 Jun 68	18:09:34.1	12.3S	166.[illegible]E	33	5.5	Solomons-New Hebrides									103°								
27 Jun 68	22:10:03.8	6.1N	120.9E	60	5.3	Sumatra-Java									55°								
27 Jun 68	22:14:01.3	8.2S	119.7E	86	5.4	Sumatra-Java									64°								
02 Jul 68	18:40:10.1	2.7S	138.9E	62	5.7	Solomons-New Hebrides									75°								
02 Jul 68	22:12:25.0	26.0N	128.6E	33	5.1	Japan									52°								
28 Jul 68	21:12:38.1	55.4N	166.6E	33	5.4	Kamchatka-Kuriles									66°								
28 Jul 68	21:23:06.7	55.3N	166.8E	22	5.1	Kamchatka-Kuriles									66°								
14 Aug 68	01:13:45.2	55.6N	162.1E	71	5.3	Kamchatka-Kuriles									64°								
18 Aug 68	11:54:59.4	48.2N	157.3E	27	5.2	Kamchatka-Kuriles									64°								
08 Sep 68	20:09:51.2	46.0N	151.4E	31	5.0	Kamchatka-Kuriles									61°								
20 Sep 68	22:25:37.1	36.8N	138.1E	53	5.0	Japan									55°								
28 Sep 68	09:54:45.9	15.9N	122.6E	27	5.2	Philippines-Taiwan									51°								
03 Oct 68	11:08:38.9	51.6N	174.1W	46	5.0	Aleutian Islands									78°								
23 Oct 68	13:25:58.9	9.1S	112.0E	46	5.4	Sumatra-Java									59°								
29 Oct 68	06:45:15.4	31.2N	141.7E	33	5.1	Japan									60°								
07 Nov 68	00:48:33.6	54.3N	164.6W	37	5.1	Aleutian Islands									80°								
07 Nov 68	14:36:38.8	45.0N	150.0E	59	5.0	Kamchatka-Kuriles									61°								
11 Nov 68	08:53:52.0	57.3N	155.3W	59	5.3	Alaska									81°								
15 Nov 68	00:07:09.7	58.3N	150.4W	26	5.1	Alaska									82°								
27 Nov 68	12:55:56.1	56.6N	157.6W	61	5.3	Alaska									81°								
07 Dec 68	15:40:57.9	51.6N	175.7E	33	5.3	Aleutian Islands									73°								
07 Dec 68	15:46:45.2	51.6N	175.8E	33	5.0	Aleutian Islands									73°								
19 Dec 68	15:15:55.7	53.3N	160.1E	33	5.4	Kamchatka-Kuriles									64°								
01 Jan 69	09:07:04.3	51.2N	179.4W	34	5.4	Aleutian Islands									76°								
05 Jan 69	07:28:55.8	4.1N	125.6E	59	5.3	Philippines-Taiwan									60°								
19 Jan 69	17:19:23.1	1.7N	127.1E	86	5.1	Philippines-Taiwan									63°								
20 Jan 69	12:24:35.2	10.3S	164.6E	4	5.6	Solomons-New Hebrides									100°								
21 Jan 69	01:47:29.6	7.3S	128.3E	91	5.6	Philippines-Taiwan									70°								
10 Feb 69	21:47:55.9	44.2N	148.5E	33	5.1	Kamchatka-Kuriles									60°								
10 Mar 69	06:54:17.6	5.6S	147.2E	206	5.8	Solomons-New Hebrides									83°								
20 Mar 69	23:38:40.6	8.8N	127.3E	33	5.1	Philippines-Taiwan									59°								

TABLE VII

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
0-5°								
21 Jun 67	12 09 54.0	35.0N	135.6E	32	4.2	MAT	2°	Japan
18 Mar 64	16 43 24.0	45.7N	14.1E	33	4.6	AQU	3°	Turkey-Greece
17 Apr 69	03 21 16.4	30.1N	69.9E	7	4.5	KBL	4°	Tadzhik-Hindu Kush
5-10°								
14 Aug 65	11 39 29.0	40.9N	141.2E	93	4.7	MAT	5°	Japan
21 Jan 66	09 43 26.7	43.2N	145.6E	37	4.7	MAT	9°	Japan
09 Feb 66	14 44 23.2	37.2N	134.9E	357	5.0	SEO	6°	Japan
20 Feb 66	00 12 25.0	41.9N	142.6E	71	4.3	MAT	6°	Japan
09 Apr 68	21 17 51.0	32.4N	141.2E	63	4.1	MAT	5°	Japan
23 Apr 66	03 49 03.4	.6S	122.0E	15	5.3	DAV	8°	Philippines-Taiwan
23 Apr 66	14 19 47.3	.3S	122.3E	108	5.1	DAV	8°	Philippines-Taiwan
01 Jul 66	22 12 18.0	2.4N	127.3E	85	5.0	DAV	5°	Philippines-Taiwan
31 Jan 64	09 23 21.0	37.5N	23.2E	75	4.3	AQU	9°	Turkey-Greece
23 Feb 64	22 41 06.3	39.2N	23.7E	33	4.5	IST	5°	Turkey-Greece
08 Apr 64	14 12 29.5	35.1N	24.3E	71	5.0	IST	7°	Turkey-Greece
09 May 66	00 42 55.6	34.5N	26.5E	33	5.5	IST	7°	Turkey-Greece
09 Nov 67	14 48 44.2	35.5N	27.8E	47	5.7	IST	6°	Turkey-Greece
08 Feb 64	06 28 25.9	36.9N	50.3E	33	4.7	SHI	7°	Iran-Turkey
21 Feb 64	01 04 00.6	34.4N	58.1E	33	5.0	SHI	7°	Iran-Turkey
16 Feb 66	09 44 22.0	29.9N	69.7E	34	4.6	NDI	6°	Tadzhik-Hindu Kush
17 Feb 66	18 26 17.7	29.9N	69.8E	22	4.4	NDI	6°	Tadzhik-Hindu Kush
28 Feb 66	20 03 00.0	35.8N	71.3E	153	4.4	NDI	8°	Tadzhik-Hindu Kush
02 Mar 66	04 02 46.5	36.1N	70.6E	162	4.5	NDI	8°	Tadzhik-Hindu Kush
04 Mar 66	06 01 05.0	30.0N	70.0E	33	4.4	NDI	6°	Tadzhik-Hindu Kush
15 Mar 66	09 14 29.3	29.9N	69.7E	36	4.7	NDI	6°	Tadzhik-Hindu Kush

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
10-14°								
10 Apr 66	22 27 01.8	41.4N	125.5W	33	5.6	BOZ	11°	California - Western U.S.
21 Jun 66	09 46 20.1	34.5N	120.7W	5	5.6	BOZ	13°	California - Western U.S.
10 Dec 67	12 06 5[illegible]3	40.5N	124.6W	5	5.8	BOZ	11°	California - Western U.S.
28 Dec 67	06 26 15.8	44.2N	128.8W	33	5.4	BOZ	12°	California - Western U.S.
01 Feb 66	15 59 41.9	45.4N	150.0E	24	4.7	MAT	12°	Kamchatka - Kurile Is.
07 Dec 66	17 17 42.0	44.3N	151.7E	26	5.8	MAT	13°	Kamchatka - Kurile Is.
02 Jan 66	04 04 45.4	31.3N	138.2E	394	5.2	SEO	11°	Japan
30 Jul 67	01 31 01.7	40.7N	30.4E	16	5.6	AQU	13°	Turkey-Greece
07 Mar 66	01 16 05.8	39.1N	41.7E	13	5.5	SHI	13°	Iran-Turkey
20 Apr 66	16 42 03.7	41.1N	48.2E	19	5.5	SHI	12°	Iran-Turkey
29 Jul 68	16 03 42.1	36.5N	53.7E	14	4.8	KBL	13°	Iran-Turkey
12 Feb 66	08 04 58.0	39.1N	71.6E	70	4.7	NDI	11°	Tadzhik-Hindu Kush
03 Apr 69	02 52 50.9	41.2N	79.2E	40	4.5	KBL	10°	Tadzhik-Hindu Kush
15 Aug 67	09 21 02.3	31.1N	93.7E	33	5.7	CHG	13°	China-Burma
28 Jun 68	20 34 55.3	30.1N	95.1E	44	4.8	CHG	12°	China-Burma
05 Jul 68	14 32 14.1	40.2N	85.5E	33	4.6	KBL	14°	China-Burma
14-16°								
11 Apr 66	17 17 33.8	18.4N	102.3W	72	5.7	DAL	15°	Central America
07 Aug 66	14 11 51.2	59.6N	144.4W	4	5.5	CMC	15°	Alaska
21 Jun 67	12 09 54.0	35.0N	135.6W	32	4.2	MAT	14°	Japan
10 Oct 65	10 21 00.7	26.3N	128.1E	33	5.4	MAT	14°	Philippines-Taiwan
20 Apr 66	16 42 03.7	41.7N	48.2E	19	5.5	IST	14°	Iran-Turkey
26 Jul 67	18 53 01.3	39.5N	40.4E	33	5.6	SHI	14°	Iran-Turkey
13 Jun 68	23 04 00.3	29.7N	51.5E	33	5.0	KBL	16°	Iran-Turkey
24 Jan 66	07 23 07.6	29.9N	69.7E	12	5.8	SHI	15°	Tadzhik-Hindu Kush
04 Jun 66	05 11 54.2	36.3N	70.8E	207	5.7	SHI	16°	Tadzhik-Hindu Kush
15 Aug 67	09 21 02.3	31.1N	93.7E	33	5.7	NDI	15°	China-Burma

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
16-21°								
24 Aug 65	00 56 21.4	15.9N	96.2W	12	5.5	DAL	17°	Central America
18 Oct 65	22 50 41.9	15.7N	95.4W	36	5.3	DAL	17°	Central America
09 Mar 66	14 02 12.8	27.6N	115.0W	33	5.4	BOZ	18°	California-Western U. S.
23 Jun 65	12 02 46.2	56.7N	152.8W	29	4.8	CMC	20°	Alaska
23 Jun 65	14 22 45.2	56.8N	152.3W	33	5.0	CMC	20°	Alaska
15 Aug 66	10 58 51.7	58.2N	153.1W	41	4.9	CMC	19°	Alaska
08 Apr 66	09 19 09.6	56.9N	152.0W	33	4.7	CMC	20°	Alaska
11 Apr 66	18 26 11.8	57.2N	153.5W	33	4.9	CMC	20°	Alaska
11 Apr 66	23 00 24.0	56.6N	152.0W	33	5.4	CMC	20°	Alaska
16 Apr 66	01 27 15.3	57.0N	153.6W	33	5.7	CMC	20°	Alaska
13 Jan 66	12 24 44.3	51.4N	156.9E	110	4.6	MAT	20°	Kamchatka-Kurile Is.
07 Dec 66	17 17 42.0	44.3N	151.7E	26	5.8	SEO	20°	Kamchatka-Kurile Is.
06 Sep 65	03 18 39.1	21.2N	121.4E	33	5.2	SEO	17°	Philippines-Taiwan
12 Mar 66	17 59 39.0	24.4N	122.8E	83	5.7	DAV	17°	Philippines-Taiwan
20 Aug 66	12 05 19.0	42.3N	18.6E	22	5.5	MAL	19°	Turkey-Greece
29 Oct 66	02 39 29.4	39.2N	21.2E	20	5.7	MAL	20°	Turkey-Greece
09 Feb 67	14 08 18.7	40.8N	20.3E	3	5.6	MAL	20°	Turkey-Greece
01 May 67	07 09 00.5	39.7N	21.3E	15	5.6	MAL	20°	Turkey-Greece
09 Feb 67	14 08 18.7	40.8N	20.3E	3	5.6	KON	20°	Turkey-Greece
04 Sep 64	03 39 36.7	39.8N	40.3E	33	5.0	AQU	20°	Iran-Turkey
17 Jun 68	04 56 31.0	40.7N	48.0E	33	4.7	KBL	18°	Iran-Turkey
17 Jun 68	04 59 04.7	40.9N	48.2E	33	5.0	KBL	18°	Iran-Turkey
15 Jul 68	08 33 37.5	32.5N	48.7E	33	4.6	KBL	17°	Iran-Turkey
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	SHI	20°	Tadzhik-Hindu Kush
05 Sep 68	08 57 45.3	46.7N	82.2E	33	4.7	KBL	16°	China-Burma

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
21-22°								
05 Feb 66	14 24 45.0	52.8N	158.8E	44	5.2	MAT	22°	Kamchatka-Kurile Is.
07 Feb 67	08 28 57.9	13.9N	144.8E	138	5.4	MAT	22°	Japan
06 Sep 65	03 18 39.1	21.2N	121.4E	33	5.2	CHG	21°	Philippines-Taiwan
06 Sep 65	03 18 39.1	21.2N	121.4E	33	5.2	MAT	21°	Philippines-Taiwan
29 Oct 66	02 39 29.4	39.2N	21.2E	20	5.7	KON	22°	Turkey-Greece
30 Jul 67	01 31 01.7	40.7N	30.4E	16	5.6	SHI	21°	Turkey-Greece
16 Feb 64	00 17 15.1	30.1N	51.2E	37	5.3	IST	21°	Iran-Turkey
22-24°								
21 Mar 65	09 42 41.3	11.7N	86.4W	36	5.2	DAL	23°	Central America
16 Sep 65	04 10 22.6	40.4N	125.7W	33	5.6	DAL	24°	California-Western U.S.
10 Dec 67	12 06 50.3	40.5N	124.6W	5	5.8	DAL	24°	California-Western U.S.
07 Aug 66	14 11 51.2	59.6N	144.4W	4	5.5	BOZ	24°	Alaska
05 Feb 66	16 16 01.0	50.2N	155.1E	98	5.8	SEO	24°	Kamchatka-Kurile Is.
30 Jul 67	01 31 01.7	40.7N	30.4E	16	5.6	KON	23°	Turkey-Greece
09 Nov 67	14 48 44.2	35.5N	27.8E	47	5.7	SHI	22°	Turkey-Greece
15 Aug 66	02 15 33.8	28.7N	78.9E	50	5.8	SHI	23°	Tadzhik-Hindu Kush
13 Feb 66	10 44 41.0	26.1N	103.2E	33	5.7	NDI	23°	China-Burma
09 Mar 66	15 06 28.0	34.8N	80.2E	33	4.5	CHG	23°	China-Burma
28 Jun 68	20 34 55.3	30.1N	95.1E	44	4.8	KBL	22°	China-Burma
24-26°								
28 Dec 67	06 26 15.8	44.2N	128.8W	33	5.4	CMC	25°	California-Western U.S.
05 Jul 64	03 14 33.3	60.8N	144.9W	30	5.0	BOZ	25°	Alaska
11 Aug 65	18 29 40.1	59.6N	145.8W	25	5.5	BOZ	25°	Alaska
09 Apr 66	18 51 45.0	60.2N	147.1W	34	4.7	BOZ	25°	Alaska
21 Aug 65	15 04 17.6	5.9S	104.2E	33	5.5	CHG	25°	Sumatra-Java
04 Sep 68	01 40 04.0	33.5N	97.5E	33	4.8	KBL	24°	China-Burma

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
26-29°								
09 Apr 66	02 34 23.0	9.4N	84.2W	40	5.3	DAL	26°	Central America
09 Apr 66	02 42 08.7	9.6N	84.1W	30	5.7	DAL	26°	Central America
11 Apr 66	17 17 33.8	18.4N	102.3W	72	5.7	BOZ	28°	Central America
10 Apr 66	22 27 01.8	41.4N	125.5W	33	5.6	CMC	27°	California-Western U.S.
10 Dec 67	12 06 50.3	40.5N	124.6W	5	5.8	CMC	28°	California-Western U.S.
28 Dec 67	06 26 15.8	44.2N	128.8W	33	5.4	DAL	27°	California-Western U.S.
28 May 64	15 18 04.2	58.3N	150.6W	25	5.4	BOZ	27°	Alaska
08 Sep 65	03 26 20.7	57.5N	152.1W	25	5.5	BOZ	27°	Alaska
22 Jan 66	14 27 07.9	56.8N	153.7W	33	5.8	BOZ	28°	Alaska
09 Apr 66	20 08 39.0	56.7N	152.0W	33	5.5	BOZ	27°	Alaska
11 Apr 66	23.00 24.0	56.6N	152.0W	33	5.4	BOZ	27°	Alaska
16 Apr 66	01 27 15.3	57.0N	153.6W	33	5.7	BOZ	28°	Alaska
22 Apr 66	10 15 51.0	56.9N	151.8W	33	4.9	BOZ	27°	Alaska
22 Jun 66	11 38 53.7	61.4N	147.6W	53	5.2	BOZ	26°	Alaska
17 Aug 65	07 36 17.0	12.4N	125.7E	76	5.0	MAT	27°	Philippines-Taiwan
29 Oct 66	02 39 29.4	39.2N	21.2E	20	5.7	SHI	28°	Turkey-Greece
01 May 67	07 09 00.5	39.7N	21.3E	15	5.6	SHI	28°	Turkey-Greece
30 Jul 67	01 31 01.7	40.7N	30.4E	16	5.6	MAL	27°	Turkey-Greece
20 Apr 66	16 42 03.7	41.7N	48.2E	19	5.5	NDI	27°	Iran-Turkey
11 Jan 67	11 20 45.7	34.1N	45.7E	34	5.6	NDI	27°	Iran-Turkey
26 Jul 67	18 53 01.3	39.5N	40.4E	33	5.6	KON	28°	Iran-Turkey
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	CHG	26°	Tadzhik-Hindu Kush
29-31°								
02 Sep 65	04 26 37.3	51.9N	175.5E	31	5.6	MAT	30°	Aleutian Is.
27 Sep 65	05 09 13.3	51.9N	175.5E	41	5.5	MAT	30°	Aleutian Is.
19 Oct 65	20 48 47.4	52.3N	174.3E	48	5.6	MAT	30°	Aleutian Is.
16 Jan 66	09 11 50.0	52.9N	171.9E	25	5.7	MAT	29°	Aleutian Is.
09 Feb 67	14 08 18.7	40.8N	20.3E	3	5.6	SHI	29°	Turkey-Greece
12 Jan 64	12 45 51.1	31.5N	49.4E	67	5.2	AQU	31°	Iran-Turkey
07 Mar 66	01 16 05.8	39.1N	41.7E	13	5.5	KON	29°	Iran-Turkey
12 Feb 66	16 34 11.3	36.6N	71.5E	188	4.9	CHG	30°	Tadzhik-Hindu Kush

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
31-42°								
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	BOZ	41°	Central America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	WES	34°	Central America
28 Dec 67	06 26 15.8	44.2N	128.8W	33	5.4	WES	41°	California-Western U.S.
19 Oct 65	20 48 47.4	52.3N	174.3E	48	5.6	CMC	36°	Aleutian Is.
23 Oct 65	06 00 48.5	53.8N	165.5W	16	5.5	MAT	42°	Aleutian Is.
04 Dec 65	02 11 49.9	51.3N	170.6W	18	5.5	MAT	39°	Aleutian Is.
02 Jan 66	04 04 45.4	31.3N	138.2E	394	5.2	CHG	37°	Japan
27 Jan 66	12 00 29.1	40.2N	140.5E	65	5.1	CHG	41°	Japan
05 Apr 66	08 51 16.4	37.0N	138.2E	4	5.1	CHG	39°	Japan
16 Apr 66	10 13 28.0	35.0N	141.5E	63	5.2	CHG	41°	Japan
21 Apr 66	15 45 25.4	36.1N	141.8E	30	5.5	CHG	41°	Japan
23 Jun 66	05 01 42.4	43.8N	139.9E	218	5.5	CHG	42°	Japan
01 Aug 65	09 19 51.7	.3N	125.8E	91	5.4	CHG	32°	Philippines-Taiwan
09 Aug 65	02 34 21.7	7.0S	123.1E	576	5.5	CHG	35°	Philippines-Taiwan
18 Aug 65	11 13 17.4	7.0S	129.1E	135	5.1	CHG	39°	Philippines-Taiwan
24 Oct 65	14 32 13.7	4.1N	125.9E	175	5.8	MAT	34°	Philippines-Taiwan
10 Jul 66	10 00 39.1	30.5S	177.8W	40	5.8	ADE	37°	Tonga Is. - Fiji Is.
30 Jul 67	01 31 01.7	40.7N	30.4E	16	5.6	NDI	40°	Turkey-Greece
04 Jul 68	21 47 55.6	37.8N	23.2E	33	5.3	KBL	37°	Turkey-Greece
31 Oct 68	03 22 15.0	36.6N	27.1E	11	5.1	KBL	34°	Turkey-Greece
03 Nov 68	04 49 31.8	42.1N	19.4E	17	5.0	KBL	39°	Turkey-Greece
19 Jan 64	09 13 53.5	26.9N	54.0E	33	5.6	CHG	42°	Iran-Turkey
19 Aug 64	09 33 10.0	28.2N	52.6E	50	5.6	AQU	35°	Iran-Turkey
20 Aug 64	05 39 47.7	28.2N	52.6E	52	5.5	AQU	35°	Iran-Turkey
11 Jan 67	11 20 45.7	34.1N	45.7E	34	5.6	KON	35°	Iran-Turkey
11 Jan 67	11 20 45.7	34.1N	45.7E	34	5.6	MAL	41°	Iran-Turkey
26 Jul 67	18 53 01.3	39.5N	40.4E	33	5.6	NDI	32°	Iran-Turkey
04 Jun 66	05 11 54.2	36.3N	70.8E	207	5.7	IST	33°	Tadzhik-Hindu Kush
01 Aug 66	19 09 55.1	29.9N	68.8E	33	5.8	IST	34°	Tadzhik-Hindu Kush
15 Aug 66	02 15 33.8	28.7N	78.9E	50	5.8	SEO	41°	Tadzhik-Hindu Kush
16 Aug 66	02 16 19.7	36.4N	70.8E	199	5.7	IST	33°	Tadzhik-Hindu Kush
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	IST	37°	Tadzhik-Hindu Kush
15 Aug 67	09 21 02.3	31.1N	93.7E	33	5.7	MAT	37°	China-Burma
15 Aug 67	09 21 02.3	31.1N	93.7E	33	5.7	SHI	35°	China-Burma

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
42-53°								
09 Apr 66	02 42 08.7	9.6N	84.1W	30	5.7	BOZ	43°	Central America
11 Apr 66	17 17 33.8	18.4N	102.3W	72	5.7	CMC	50°	Central America
16 Apr 65	23 22 18.6	64.7N	160.1W	5	5.8	SEO	49°	Alaska
11 Aug 65	18 29 40.1	59.6N	145.8W	25	5.5	MAT	52°	Alaska
22 Jan 66	14 27 07.9	56.8N	153.7W	33	5.8	WES	52°	Alaska
16 Apr 66	10 27 15.3	57.0N	153.6W	33	5.7	DAL	45°	Alaska
16 Apr 66	01 27 15.3	57.0N	153.6W	33	5.7	WES	52°	Alaska
07 Oct 66	20 55 56.0	51.6N	150.1W	56	5.7	MAT	50°	Alaska
07 Feb 67	14 53 13.9	56.7N	157.2W	67	5.6	MAT	47°	Alaska
21 Jun 67	18 04 49.5	64.8N	147.4W	17	5.4	MAT	51°	Alaska
28 Sep 67	15 44 55.7	59.5N	147.1W	28	5.6	MAT	52°	Alaska
29 Jan 66	07 52 08.8	45.8N	151.5E	33	5.1	CHG	51°	Kamchatka-Kurile Is.
10 Feb 66	20 13 33.0	47.2N	150.8E	162	5.3	CHG	51°	Kamchatka-Kurile Is.
09 Mar 66	08 11 40.0	43.3N	145.8E	11	5.6	CHG	46°	Kamchatka-Kurile Is.
21 Jun 66	23 06 25.9	50.1N	157.8E	14	5.8	CMC	44°	Kamchatka-Kurile Is.
07 Dec 66	17 17 42.0	44.3N	151.7E	26	5.8	CMC	51°	Kamchatka-Kurile Is.
18 Feb 66	19 02 51.5	44.3N	143.1E	225	5.2	CHG	45°	Japan
02 Jul 68	22 12 25.0	26.0N	128.6E	33	5.1	KBL	52°	Japan
28 Sep 68	09 54 45.9	15.9N	122.6E	27	5.2	KBL	51°	Philippines-Taiwan
17 Aug 65	11 14 10.4	5.2S	152.6E	47	5.8	MAT	44°	Solomon Is. - New Hebrides
17 Aug 65	10 35 04.1	5.3N	96.2E	33	5.3	MAT	50°	Sumatra-Java
17 Aug 65	10 35 04.1	5.3N	96.2E	33	5.3	SHI	48°	Sumatra- Java
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	ADE	43°	Tonga Is. - Fiji Is.
28 Aug 66	07 29 34.7	35.8S	178.5E	94	5.8	MUN	51°	Tonga Is. - Fiji Is.
05 Feb 66	02 01 48.3	39.2N	22.0E	38	5.8	NDI	46°	Turkey-Greece
09 May 66	00 42 55.6	34.5N	26.5E	33	5.5	NDI	43°	Turkey-Greece
29 Oct 66	02 39 29.4	39.2N	21.2E	20	5.7	NDI	47°	Turkey-Greece
09 Feb 67	14 08 18.7	40.8N	20.3E	3	5.6	NDI	48°	Turkey-Greece
01 May 67	07 09 00.5	39.7N	21.3E	15	5.6	NDI	47°	Turkey-Greece
12 Jan 64	12 45 51.1	31.5N	49.4E	67	5.2	CHG	46°	Iran-Turkey
19 Aug 64	09 33 10.0	28.2N	52.6E	50	5.6	CHG	43°	Iran-Turkey
20 Aug 64	05 39 47.7	28.2N	52.6E	52	5.5	CHG	43°	Iran-Turkey
24 Jan 66	07 23 07.6	29.9N	69.7E	12	5.8	KON	50°	Tadzhik-Hindu Kush

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
42-53 (Cont'd.)								
24 Jan 66	07 23 07.6	29.9N	69.7E	12	5.8	SEO	48°	Tadzhik-Hindu Kush
28 Jan 66	08 52 02.2	39.3N	73.1E	20	5.4	MAT	50°	Tadzhik-Hindu Kush
02 Feb 66	09 20 07.5	33.9N	73.0E	26	5.3	MAT	52°	Tadzhik-Hindu Kush
04 Jun 66	05 11 54.2	36.3N	70.8E	207	5.7	KON	45°	Tadzhik-Hindu Kush
01 Aug 66	19 09 55.1	29.9N	68.8E	33	5.8	KON	49°	Tadzhik-Hindu Kush
01 Aug 66	19 09 55.1	29.9N	68.8E	33	5.8	SEO	48°	Tadzhik-Hindu Kush
25 Jan 67	01 50 19.4	36.6N	71.6E	281	5.7	MAT	52°	Tadzhik-Hindu Kush
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	KON	49°	Tadzhik-Hindu Kush
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	MAT	51°	Tadzhik-Hindu Kush
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	SEO	42°	Tadzhik-Hindu Kush
13 Feb 66	10 44 41.0	26.1N	103.2E	33	5.7	SHI	44°	China-Burma
53-56°								
22 Jan 66	14 27 07.9	56.8N	153.7W	33	5.8	SEO	54°	Alaska
07 Oct 66	20 55 56.0	61.6N	150.1W	56	5.7	SEO	55°	Alaska
28 Feb 66	02 02 13.6	43.7N	139.6E	225	5.5	CMC	56°	Japan
20 Aug 66	09 32 31.7	43.1N	140.6E	161	5.8	CMC	56°	Japan
12 Nov 66	12 49 43.6	41.8N	144.1E	33	5.8	ND1	55°	Japan
20 Sep 68	22 25 37.1	36.8N	138.1E	59	5.0	KBL	55°	Japan
02 Nov 65	15 47 24.0	4.3S	101.2E	11	5.4	MAT	54°	Sumatra-Java
27 Jun 68	22 10 03.8	6.1N	120.9E	60	5.3	KBL	55°	Sumatra-Java
26 Jul 67	18 53 01.3	39.5N	40.4E	33	5.6	CHG	54°	Iran-Turkey
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	DAV	53°	Tadzhik-Hindu Kush
27 Jun 66	10 49 50.0	29.8N	80.7E	33	5.8	KON	55°	China-Burma

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
56-59°								
05 Feb 66	16 16 01.0	50.2N	155.1E	98	5.8	BOZ	59°	Kamchatka-Kurile Is.
15 Jun 68	19 53 09.2	41.9N	142.7E	33	5.2	KBL	57°	Japan
20 Mar 69	23 38 40.6	8.8N	127.3E	33	5.1	KBL	59°	Philippines-Taiwan
04 Aug 65	08 47 12.4	13.2S	167.0E	237	5.7	MAT	57°	Solomon Is. - New Hebrides
13 Aug 65	04 40 55.3	15.9S	167.5E	34	5.7	MAT	59°	Solomon Is. - New Hebrides
14 Aug 65	11 07 47.1	15.8S	166.8E	33	5.5	MAT	59°	Solomon Is. - New Hebrides
23 Oct 68	13 25 58.9	9.1S	112.0E	46	5.4	KBL	59°	Sumatra-Java
10 Jul 66	10 00 39.1	30.5S	177.8W	40	5.8	MUN	56°	Tonga Is. - Fiji Is.
24 Jan 66	07 23 07.6	29.9N	69.7E	12	5.8	DAV	57°	Tadzhik-Hindu Kush
01 Aug 66	19 09 55.1	29.9N	68.8E	33	5.8	MAT	57°	Tadzhik-Hindu Kush
16 Aug 66	02 16 19.7	36.4N	70.8E	199	5.7	MAL	59°	Tadzhik-Hindu Kush
59-63°								
09 Apr 66	02 42 08.7	9.6N	84.1W	30	5.7	CMC	62°	Central America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	CMC	60°	Central America
22 Jan 66	14 27 07.9	56.8N	153.7W	33	5.8	KON	63°	Alaska
16 Apr 66	01 27 15.3	57.0N	153.6W	33	5.7	KON	63°	Alaska
16 Jan 66	19 44 39.5	54.9N	165.8E	15	5.6	CHG	61°	Kamchatka-Kurile Is.
05 Feb 66	16 16 01.0	50.2N	155.1E	98	5.8	NDI	61°	Kamchatka-Kurile Is.
07 Dec 66	17 18 42.0	44.3N	151.7E	26	5.8	NDI	60°	Kamchatka-Kurile Is.
08 Sep 68	20 09 51.2	46.0N	151.4E	31	5.0	KBL	61°	Kamchatka-Kurile Is.
07 Nov 68	14 36 38.8	45.0N	150.0E	59	5.0	KBL	61°	Kamchatka-Kurile Is.
10 Feb 69	21 47 55.9	44.2N	148.5E	33	5.1	KBL	60°	Kamchatka-Kurile Is.
08 Jan 66	22 39 17.9	37.3N	138.3E	10	5.6	CMC	62°	Japan
29 Oct 68	06 45 15.4	31.2N	141.7E	33	5.1	KBL	60°	Japan
05 Jan 69	07 28 55.8	4.1N	125.6E	59	5.3	KBL	60°	Philippines-Taiwan
21 Aug 65	15 04 17.6	5.9S	104.2E	33	5.5	SHI	61°	Sumatra-Java
08 Oct 65	15 21 65.4	6.1S	103.8E	33	5.7	SHI	61°	Sumatra-Java
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	MUN	62°	Tonga Is. - Fiji Is.
30 Jul 67	01 31 01.7	40.7N	30.4E	16	5.6	CHG	62°	Turkey-Greece
19 Aug 64	09 33 10.0	28.2N	52.6E	50	5.6	SEO	62°	Iran-Turkey

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
59-63° (Cont'd.)								
19 Aug 64	15 20 13.9	28.2N	52.7E	50	5.6	SEO	62°	Iran-Turkey
20 Aug 64	05 39 47.7	28.2N	52.6E	52	5.5	SEO	62°	Iran-Turkey
20 Apr 64	16 42 03.7	41.7N	48.2E	19	5.5	SEO	59°	Iran-Turkey
24 Jan 66	07 23 07.6	29.9N	69.7E	12	5.8	MAL	61°	Tadzhik-Hindu Kush
01 Aug 66	19 09 55.1	29.9N	68.8E	33	5.8	MAL	60°	Tadzhik-Hindu Kush
13 Feb 66	10 44 41.0	26.1N	103.2E	33	5.7	IST	62°	China-Burma
15 Aug 67	09 21 02.3	31.1N	93.7E	33	5.7	AQU	63°	China-Burma
63-67°								
02 Sep 65	04 26 37.3	51.9N	175.5E	31	5.6	CHG	67°	Aleutian Is.
19 Oct 65	20 48 47.4	52.3N	174.3E	48	5.6	CHG	66°	Aleutian Is.
05 Feb 66	16 16 01.0	50.2N	155.1E	98	5.8	KON	67°	Kamchatka-Kurile Is.
28 Jul 68	21 12 38.1	55.4N	166.6E	33	5.4	KBL	66°	Kamchatka-Kurile Is.
28 Jul 68	21 23 06.7	55.3N	166.8E	22	5.1	KBL	66°	Kamchatka-Kurile Is.
14 Aug 68	01 13 45.2	55.6N	162.1E	71	5.3	KBL	64°	Kamchatka-Kurile Is.
18 Aug 68	11 54 59.4	48.2N	157.3E	27	5.2	KBL	64°	Kamchatka-Kurile Is.
19 Dec 68	15 15 55.7	53.3N	160.1E	33	5.4	KBL	64°	Kamchatka-Kurile Is.
19 Jan 69	17 19 23.1	1.7N	127.1E	86	5.1	KBL	63°	Philippines-Taiwan
27 Jun 68	22 14 01.3	8.2S	119.7E	86	5.4	KBL	64°	Sumatra-Java
05 Feb 66	02 01 48.3	39.2N	22.0E	38	5.8	WES	67°	Turkey-Greece
01 May 67	07 09 00.5	39.7N	21.3E	15	5.6	WES	66°	Turkey-Greece
11 Jan 67	11 20 45.7	34.1N	45.7E	34	5.6	SEO	64°	Iran-Turkey
10 Jun 66	22 41 48.5	45.1N	99.7E	33	5.1	CMC	64°	China-Burma
67-72°								
22 Nov 65	14 00 27.0	52.0N	176.1W	49	5.5	CHG	72°	Aleutian Is.
23 Nov 65	02 17 49.4	51.4N	179.7W	48	5.6	CHG	70°	Aleutian Is.
15 May 66	14 46 06.5	51.5N	178.4W	31	5.8	CHG	[illegible]	Aleutian Is.
21 Jun 66	23 06 25.9	50.1N	157.8E	14	5.8	KON	[illegible]	Kamchatka-Kurile Is.
07 Dec 66	17 17 42.0	44.3N	151.7E	26	5.8	KON	[illegible]	Kamchatka-Kurile Is.
28 Feb 66	02 02 13.6	43.7N	139.6E	225	5.5	BOZ	71°	Japan
20 Aug 66	09 32 31.7	43.1N	140.6E	161	5.8	BOZ	71°	Japan

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min	Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
67-72° (Cont'd.)									
12 Nov 66	12 49	43.6	41.8N	144.1E	33	5.8	BOZ	70°	Japan
12 Nov 66	12 49	43.6	41.8N	144.1E	33	5.8	KON	72°	Japan
21 Jan 69	01 47	29.6	7.3S	128.3E	91	5.6	KBL	70°	Philippines-Taiwan
04 Mar 67	06 16	21.9	18.5S	175.4W	225	5.7	MAT	70°	Tonga Is. - Fiji Is.
05 Feb 66	02 01	48.3	39.2N	22.0E	38	5.8	CMC	69°	Turkey-Greece
20 Aug 66	12 05	19.0	42.3N	18.6E	22	5.5	CHG	71°	Turkey-Greece
29 Oct 66	02 39	29.4	39.2N	21.2E	20	5.7	WES	67°	Turkey-Greece
09 Feb 67	14 08	18.7	40.8N	20.3E	3	5.6	CHG	70°	Turkey-Greece
09 Feb 67	14 08	18.7	40.8N	20.3E	3	5.6	CMC	67°	Turkey-Greece
01 May 67	07 09	00.5	39.7N	21.3E	15	5.6	CMC	68°	Turkey-Greece
30 Jul 67	01 37	01.7	40.7N	30.4E	16	5.6	CMC	69°	Turkey-Greece
30 Jul 67	01 37	01.7	40.7N	30.4E	16	5.6	SEO	71°	Turkey-Greece
30 Jul 67	01 37	01.7	40.7N	30.4E	16	5.6	WES	71°	Turkey-Greece
13 Feb 66	10 44	41.0	26.1N	103.2E	33	5.7	ADE	69°	China-Burma
72-79°									
10 Dec 67	12 06	50.3	40.5N	124.6W	5	5.8	KON	73°	California-Western U.S.
22 Jan 66	14 27	07.9	56.8N	153.7W	33	5.8	DAV	79°	Alaska
07 Oct 66	20 55	56.0	61.6N	150.1W	56	5.7	IST	77°	Alaska
23 Oct 65	06 00	48.5	53.8N	165.5W	16	5.5	CHG	78°	Aleutian Is.
03 Oct 68	11 08	38.9	51.6N	174.1W	46	5.0	KBL	78°	Aleutian Is.
07 Dec 68	15 40	57.9	51.6N	175.7E	33	5.3	KBL	73°	Aleutian Is.
07 Dec 68	15 46	45.2	51.6N	175.8E	33	5.0	KBL	73°	Aleutian Is.
01 Jan 69	09 07	04.3	51.2N	179.4W	34	5.4	KBL	76°	Aleutian Is.
16 Jan 66	19 44	39.5	54.9N	165.8E	15	5.6	SHI	78°	Kamchatka-Kurile Is.
28 Jan 66	22 38	12.2	51.6N	157.0E	107	5.6	SHI	76°	Kamchatka-Kurile Is.
05 Feb 66	16 16	01.0	50.2N	155.1E	98	5.8	DAL	76°	Kamchatka-Kurile Is.
05 Feb 66	16 16	01.0	50.2N	155.1E	98	5.8	IST	78°	Kamchatka-Kurile Is.
11 May 66	14 17	34.1	48.9N	156.2E	13	5.8	SHI	76°	Kamchatka-Kurile Is.
21 Jun 66	23 06	25.9	50.1N	157.8E	14	5.8	WES	78°	Kamchatka-Kurile Is.
07 Dec 66	17 17	42.0	44.3N	151.7E	26	5.8	SHI	76°	Kamchatka-Kurile Is.
08 Jan 66	22 39	17.9	37.3N	138.3E	10	5.6	BOZ	76°	Japan

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
72-79° (Cont'd.)								
28 Feb 66	02 02 13.6	43.7N	139.6E	225	5.5	IST	75°	Japan
12 Nov 66	12 49 43.6	41.8N	144.1E	33	5.8	SHI	72°	Japan
02 Jul 68	18 40 10.1	2.7S	138.9E	62	5.7	KBL	75°	Solomon Is. - New Hebrides
19 Sep 65	01 26 52.5	22.1S	174.9W	33	5.4	MAT	73°	Tonga Is. - Fiji Is.
27 Apr 65	14 09 07.1	35.7N	23.5E	50	5.5	SEO	78°	Turkey-Greece
09 May 66	00 42 55.6	34.5N	26.5E	33	5.5	CMC	74°	Turkey-Greece
09 May 66	00 42 55.6	34.5N	26.5E	33	5.5	SEO	77°	Turkey-Greece
09 May 66	00 42 55.6	34.5N	26.5E	33	5.5	WES	73°	Turkey-Greece
01 May 67	07 09 00.5	39.7N	21.3E	15	5.6	SEO	77°	Turkey-Greece
28 Mar 68	07 39 57.1	37.9N	20.9E	6	5.4	SEO	79°	Turkey-Greece
07 Mar 66	01 16 05.8	39.1N	41.7E	13	5.5	CMC	72°	Iran-Turkey
11 Jan 67	11 20 45.7	34.1N	45.7E	34	5.6	CMC	77°	Iran-Turkey
26 Jul 67	18 53 01.3	39.5N	40.4E	33	5.6	MAT	73°	Iran-Turkey
28 Jan 66	08 52 02.[illegible]	39.3N	73.1E	20	5.4	CMC	73°	Tadzhik-Hindu Kush
20 Feb 67	15 18 39.9	33.7N	75.3E	24	5.7	CMC	78°	Tadzhik-Hindu Kush
31 Mar 66	23 38 00.5	36.4N	70.8E	200	5.6	CMC	76°	Tadzhik-Hindu Kush
15 Aug 67	09 21 02.3	31.1N	93.7E	33	5.7	ADE	78°	China-Burma
79-84°								
09 Apr 66	02 42 08.7	9.6N	84.1W	30	5.7	KON	84°	Central America
22 Jan 66	14 27 07.9	56.8N	153.7W	33	5.8	CHG	84°	Alaska
16 Apr 66	01 27 15.3	57.0N	153.6W	33	5.7	CHG	84°	Alaska
16 Apr 66	01 27 15.3	57.0N	153.6W	33	5.7	IST	82°	Alaska
07 Oct 66	20 55 56.0	61.6N	150.1W	56	5.7	CHG	83°	Alaska
07 Oct 66	20 55 56.0	61.6N	150.1W	56	5.7	NDI	82°	Alaska
11 Nov 68	08 53 52.0	57.3N	155.3W	59	5.3	KBL	81°	Alaska
15 Nov 68	00 07 09.7	58.3N	150.4W	26	5.1	KBL	82°	Alaska
27 Nov 68	12 55 56.1	56.6N	157.6W	61	5.3	KBL	81°	Alaska
07 Nov 68	00 48 33.6	54.3N	164.6W	37	5.1	KBL	80°	Aleutian Is.
05 Feb 66	16 16 01.0	50.2N	155.1E	98	5.8	WES	79°	Kamchatka-Kurile Is.
11 May 66	14 17 34.1	48.9N	156.2E	13	5.8	IST	79°	Kamchatka-Kurile Is.
10 Mar 69	06 54 17.6	5.6S	147.2E	206	5.8	KBL	83°	Solomon Is. - New Hebrides

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
79-84 (Cont'd.)								
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	SEO	79°	Tonga Is. - Fiji Is.
20 Aug 66	12 05 19.0	42.3N	18.6E	22	5.5	BOZ	82°	Turkey-Greece
01 May 67	07 09 00.5	39.7N	21.3E	15	5.6	MAT	84°	Turkey-Greece
30 Jul 67	01 31 01.7	40.7N	30.4E	16	5.6	MAT	79°	Turkey-Greece
02 Dec 67	12 44 42.7	41.3N	20.3E	17	5.4	MAT	84°	Turkey-Greece
24 Jan 66	07 23 07.6	29.9N	69.7E	12	5.8	CMC	82°	Tadzhik-Hindu Kush
31 Jan 66	02 35 05.8	27.9N	99.6E	33	5.6	CMC	81°	China-Burma
13 Feb 66	10 44 41.0	26.1N	103.2E	33	5.7	CMC	82°	China-Burma
06 Mar 66	02 10 56.8	31.6N	80.5E	35	5.4	CMC	80°	China-Burma
84-98°								
11 Apr 66	17 17 33.8	18.4N	102.3W	72	5.7	KON	85°	Central America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	AQU	90°	Central America
10 Dec 67	12 06 50.3	40.5N	124.6W	5	5.8	MAL	86°	California-Western U.S.
22 Jan 66	14 27 07.9	56.8N	153.7W	33	5.8	NDI	85°	Alaska
22 Jan 66	14 27 07.9	56.8N	153.7W	33	5.8	SHI	91°	Alaska
16 Apr 66	01 27 15.3	57.0N	153.6W	33	5.7	SHI	91°	Alaska
15 Aug 66	13 36 23.7	60.4N	146.0W	9	5.3	CHG	85°	Alaska
07 Oct 66	20 55 56.0	61.6N	150.1W	56	5.7	SHI	87°	Alaska
05 Feb 66	16 16 01.0	50.2N	155.1E	98	5.8	MAL	92°	Kamchatka-Kurile Is.
07 Dec 66	17 17 42.0	44.3N	151.7E	26	5.8	WES	85°	Kamchatka-Kurile Is.
12 Nov 66	12 49 43.6	41.8N	144.1E	33	5.8	WES	90°	Japan
14 Sep 65	08 27 15.9	8.4N	126.8E	33	5.7	CMC	92°	Philippines - Taiwan
20 Mar 66	07 47 50.2	17.0S	174.3W	117	5.7	CMC	95°	Tonga Is. - Fiji Is.
10 Jul 66	10 00 39.1	30.5S	177.8W	40	5.8	BOZ	97°	Tonga Is. - Fiji Is.
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	BOZ	87°	Tonga Is. - Fiji Is.
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	CHG	92°	Tonga Is. - Fiji Is.
28 Aug 66	07 29 34.7	35.8S	178.5E	94	5.8	CHG	93°	Tonga Is. - Fiji Is.
28 Aug 66	07 29 34.7	35.8S	178.5E	94	5.8	SEO	87°	Tonga Is. - Fiji Is.
04 Mar 67	06 16 21.9	18.5S	175.4W	225	5.7	CMC	97°	Tonga Is. - Fiji Is.
05 Apr 65	03 12 54.2	37.7N	21.8E	34	5.7	DAL	89°	Turkey-Greece

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
84-98° (Cont'd.)								
05 Feb 66	02 01 48.3	39.2N	22.0E	38	5.8	BOZ	86°	Turkey Greece
05 Feb 66	02 01 48.3	39.2N	22.0E	38	5.8	DAL	89°	Turkey-Greece
29 Oct 66	02 39 29.4	39.2N	21.2E	20	5.7	BOZ	86°	Turkey-Greece
29 Oct 66	02 39 29.4	39.2N	21.2E	20	5.7	DAL	88°	Turkey-Greece
01 May 67	07 09 00.5	39.7N	21.3E	15	5.6	BOZ	85°	Turkey-Greece
28 Mar 68	07 39 57.1	37.9N	20.9E	6	5.4	MAT	86°	Turkey-Greece
07 Mar 66	01 16 05.8	39.1N	41.7E	13	5.5	BOZ	92°	Iran-Turkey
20 Apr 66	16 42 03.7	41.7N	48.2E	19	5.5	BOZ	91°	Iran-Turkey
11 Jan 67	11 20 45.7	34.1N	45.7E	34	5.6	WES	85°	Iran-Turkey
02 Feb 65	15 56 51.0	37.5N	73.4E	33	5.8	BOZ	97°	Tadzhik-Hindu Kush
10 Aug 66	22 05 35.0	38.4N	69.6E	4	5.5	BOZ	96°	Tadzhik-Hindu Kush
27 Jun 66	10 49 50.0	29.8N	80.7E	33	5.8	ADE	85°	China-Burma
98-103°								
17 Jun 68	18 09 34.1	12.3S	166.7E	33	5.5	KBL	103°	Solomon Is. - New Hebrides
20 Jan 69	12 24 35.2	10.3S	164.6E	4	5.6	KBL	100°	Solomon Is. - New Hebrides
04 Jun 66	05 11 54.2	36.3N	70.8E	207	5.7	BOZ	98°	Tadzhik-Hindu Kush
27 May 67	19 05 48.5	36.1N	77.8E	35	5.4	BOZ	98°	Tadzhik-Hindu Kush
01 Aug 66	20 30 57.0	29.9N	68.6E	33	5.7	WES	99°	Tadzhik-Hindu Kush
31 Mar 66	23 38 00.5	36.4N	70.8E	200	5.6	BOZ	98°	Tadzhik-Hindu Kush
110-115°								
28 Apr 69	23 20 42.9	33.3N	116.3W	20	5.7	KBL	112°	California - Western U.S.
26 Jun 68	15 40 31.1	22.2S	171.4E	90	5.6	KBL	112°	Solomon Is. - New Hebrides
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	NDI	114°	Tonga Is. - Fiji Is.
11 Jan 67	11 20 45.7	34.1N	45.7E	34	5.6	ADE	111°	Iran-Turkey

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
118-127°								
17 Nov 68	00 16 08.6	9.5N	72.6W	172	5.7	KBL	123°	South America
11 Apr 66	17 17 33.8	18.4N	102.3W	72	5.7	SHI	126°	Central America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	SHI	125°	Central America
25 Sep 68	10 38 38.4	15.6N	92.6W	138	5.7	KBL	127°	Central America
25 Nov 68	00 53 01.3	20.3N	109.3W	33	5.0	KBL	125°	California - Western U. S.
04 Apr 69	16 26 17.2	24.4N	109.8W	31	5.6	KBL	121°	California - Western U. S.
25 Aug 68	11 15 46.3	20.0S	175.3W	96	5.5	KBL	122°	Tonga Is. - Fiji Is.
06 Oct 68	05 15 11.5	15.0S	175.5W	33	5.3	KBL	119°	Tonga Is. - Fiji Is.
19 Oct 68	17 28 45.6	15.2S	173.3W	33	5.2	KBL	121°	Tonga Is. - Fiji Is.
29 Oct 68	11 26 51.8	22.5S	175.2W	33	5.1	KBL	123°	Tonga Is. - Fiji Is.
07 Nov 68	03 32 50.8	16.6S	172.7W	33	5.1	KBL	122°	Tonga Is. - Fiji Is.
127-136°								
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	ADE	133°	Central America
16 Dec 68	03 07 24.1	7.1N	82.2W	16	5.3	KBL	130°	Central America
10 Mar 69	08 15 08.4	12.3N	87.5W	62	5.3	KBL	128°	Central America
14 Mar 69	08 47 16.3	12.9N	86.8W	178	5.6	KBL	128°	Central America
136-140°								
11 Apr 66	17 17 33.8	18.4N	102.3W	72	5.7	CHG	138°	Central America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	NDI	137°	Central America
10 Jul 66	10 00 39.1	30.5S	177.8W	40	5.8	SHI	136°	Tonga Is. - Fiji Is.
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	SHI	136°	Tonga Is. - Fiji Is.
140-145°								
30 Jul 68	20 38 42.0	6.9S	80.5W	37	5.8	KBL	141°	South America
22 Sep 68	21 52 59.2	24.1S	66.9W	194	5.5	KBL	140°	South America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	DAV	144°	Central America
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	KON	140°	Tonga Is. - Fiji Is.
145-155°								
09 Apr 66	02 42 08.7	9.6N	84.1W	30	5.7	CHG	152°	Central America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	CHG	150°	Central America

TABLE VII (Cont'd.)

Small-Event Information, 2 to 166° Distance

(Listed by Distance Interval)

DATE	ORIGIN TIME Hr Min Sec	LATITUDE (Degrees)	LONGITUDE (Degrees)	DEPTH (km)	NOS m_b	STATION	DISTANCE	SOURCE REGION
145-155° (cont'd.)								
09 Apr 66	02 42 08.7	9.6N	84.1W	30	5.7	DAV	146°	Central America
03 Oct 67	18 16 03.2	10.9N	85.9W	21	5.8	MUN	151°	Central America
02 May 66	16 39 44.0	8.6S	114.9E	103	5.8	WES	146°	Sumatra-Java
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	IST	151°	Tonga Is. - Fiji Is.
155-166°								
10 Aug 66	05 01 09.4	20.1S	175.3W	96	5.8	MAL	162°	Tonga Is. - Fiji Is.
28 Aug 66	07 29 34.7	35.8S	178.5E	94	5.8	KON	155°	Tonga Is. - Fiji Is.

TABLE VIII

Station Information - Small Events

STATION	LOCATION	LATITUDE (Deg Min Sec)	LONGITUDE (Deg Min Sec)	ELEVATION (Meters)
ADE	Adelaide, Australia	34 58 01.0S	138 42 32.0E	655
AQU	Aquila, Italy	42 21 14.0N	13 24 11.0E	720
BOZ	Bozeman, Montana	45 36 00.0N	111 38.00.0W	1575
CHG	Chiengmai, Thailand	18 47 24.0N	98 58 37.0E	416
CMC	Copper Mine, Canada	67 50 00.0N	115 05 00.0W	31
DAL	Dallas, Texas	32 50 46.0N	96 47 02.0W	187
DAV	Davao, Philippine Is.	7 05 16.0N	125 34 29.0E	85
IST	Istanbul, Turkey	41 02 44.0N	28 59 06.0E	50
KBL	Kabul, Afganistan	34 34 00.0N	69 06 24.0E	1980
KON	Kongsberg, Norway	59 38 57.0N	9 37 55.0E	200
MAL	Malaga, Spain	36 43 59.0N	4 24 40.0W	60
MAT	Matsushiro, Japan	36 32 30.0N	138 12 32.0E	440
MUN	Mundaring, Australia	31 58 42.0S	116 12 28.0E	253
NDI	New Delhi, India	28 41 00.0N	77 13 00.0E	230
SEO	Seoul, Korea	37 34 00.0N	126 58 00.0E	86
SHI	Shiraz, Iran	29 38 18.0N	52 31 12.0E	1596
WES	Weston, Massachusetts	42 23 04.9N	71 19 19.5W	60

20 seconds into the coda.

To quantitatively determine the difference in coda levels for the two sets of determinations, the average difference for each distance interval and an associated t-statistic for this difference were computed as follows:

Let $\overline{X}_i$ be the average small-event coda amplitude at the i^{th} time point;

m_i be the number of individual coda values at the i^{th} time point which went into the determination of $\overline{X}_i$;

s_{x_i} be the standard deviations of the individual small event coda determinations at the i^{th} time point;

$\overline{Y}_i$ be the average large-event coda amplitude at the i^{th} time point;

n_i be the number of individual coda values at the i^{th} time point which went into the determination of $\overline{Y}_i$;

s_{y_i} be the standard deviation of the individual large-event coda determination at the i^{th} time point.

Then:

$$\delta_i = \overline{Y}_i - \overline{X}_i,$$

and

$$\overline{\delta} = p^{-1} \sum_{i=1}^{p} \delta_i,$$

where P is the number of time points for which corresponding large-event and small-event average coda determinations are available.

To compute the associated t-statistic, we must first determine the standard deviation of the mean, s, where

$$s^2 = \frac{\sum_{i=1}^{P} (m_i - 1) s_{x_i}^2 + \sum_{i=1}^{P} (n_i - 1) s_{y_i}^2}{\sum_{i=1}^{P} (m_i - 1) + \sum_{i=1}^{P} (n_i - 1)}$$

and

$$t = \frac{\sum_{i=1}^{P} \delta_i}{s \sqrt{\sum_{i=1}^{P} \frac{1}{m_i} + \sum_{i=1}^{P} \frac{1}{n_i}}}$$

Note that the number of degrees of freedom (d.f.) associated with the t-statistic is

$$d.f. = \sum_{i=1}^{p} (m_i - 1) + \sum_{i=1}^{p} (n_i - 1)$$

Using the data given in Appendix I and performing the computation outlined above yields the results shown in Table IX. It should be noted, however, that because small-event codas start at relatively high coda levels, while large-event codas rise for the first 10 to 20 seconds, we have omitted from our computations the coda determinations plotted at elapsed times of 0 (read in the 0-5 second time window) and 10 (read in the 5-10 second time window) seconds. Out of 17 data sets, 13 show the large-event codas to be significantly larger than the small-event codas at the 95% confidence level (one-sided t-test). The mean difference is 0.14 m_b units.

Two data sets show the small-event codas to be larger than the large-event codas by about 0.11 m_b units. These data (Figures 13 and 15 in Appendix I) were observed at PKP distances, and the negative results obtained are due probably to the paucity of data and to the low signal-to-noise ratios observed on the original seismograms (Figure 3) rather than to a real difference in coda behavior. Seismograms with low signal-to-noise ratios, which are observed more frequently for small events, can yield relatively

TABLE IX

Coda Difference Analysis

(Observations at 0 and 10 Seconds Eliminated)

DISTANCE INTERVAL	AVERAGE DIFFERENCE IN MEAN CODA (m_b)	STANDARD DEVIATION (m_b)	T-VALUE	DEG. FREEDOM
42-53°	0.16	0.21	5.90*	460
53-56°	0.02	0.22	0.37	90
56-59°	0.09	0.18	1.88*	87
59-63°	0.25	0.21	6.87*	234
63-67°	0.09	0.17	3.32*	173
67-72°	0.11	0.17	4.82*	312
72-79°	0.13	0.18	6.11*	385
79-84°	0.17	0.17	6.06*	220
84-98°	0.13	0.16	8.25*	682
98-103°	0.03	0.13	1.09	116
110-115°	0.05	0.11	1.87*	69
118-127°	0.08	0.14	3.64*	199
127-136°	-0.11	0.04	-13.72*	165
136-140°	0.19	0.17	4.39*	46
140-145°	-0.11	0.14	-3.00*	47
145-155°	0.28	0.14	8.73*	65
155-166°	0.14	0.07	6.72*	49

*Significant at the 95% confidence level for a one-sided t-test; critical test value is 1.64.

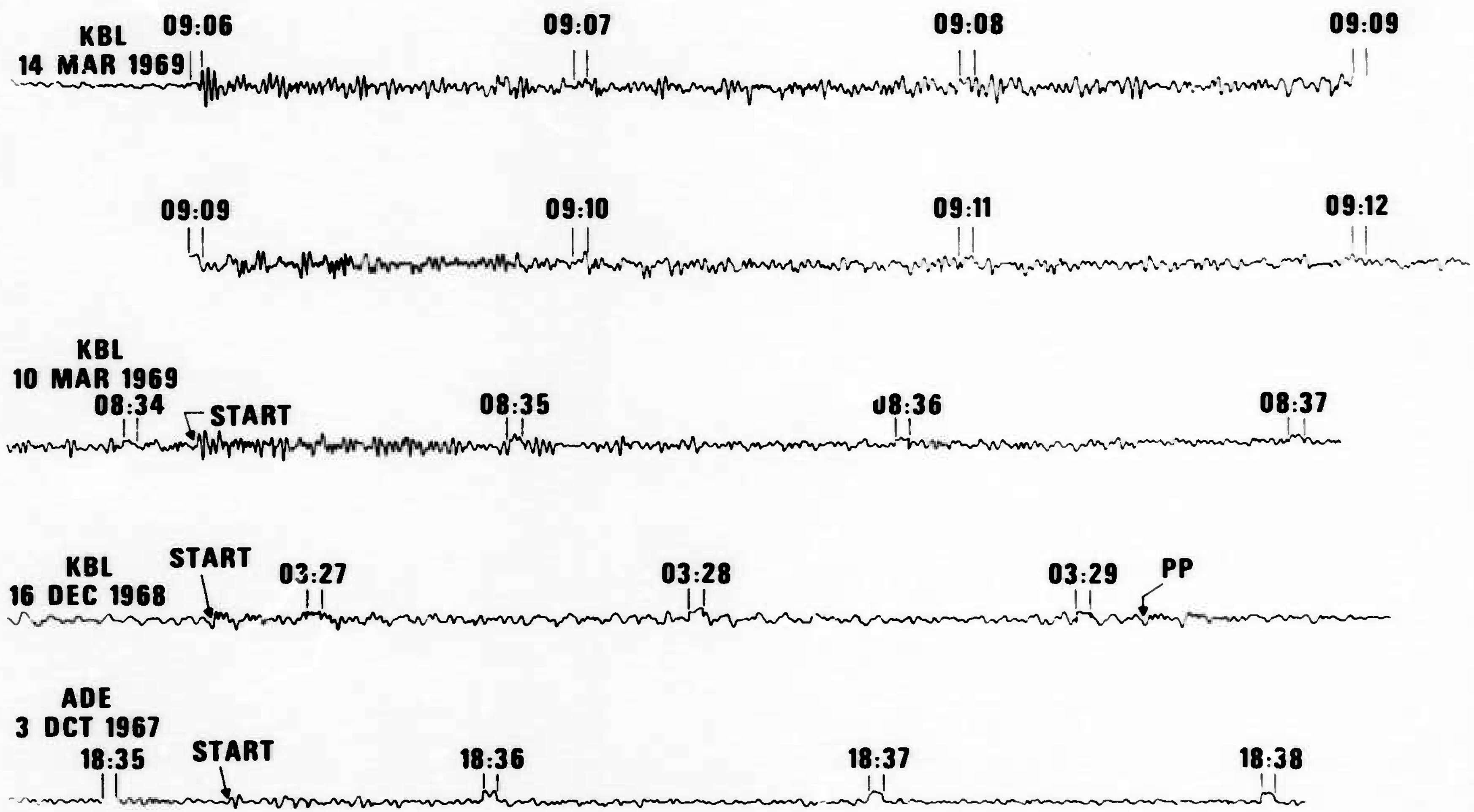


Figure 3. Small-event seismograms in the distance interval 127-136°.

high determinations throughout the coda. When this occurs, the average coda determinations for small events are biased upwards, thus lessening and apparently eliminating, in some cases, what the greater portion of the data suggest to be a significant upward bias in relative coda amplitude with magnitude.

Though convinced that a difference is observed between large-event and small-event codas, we find it difficult to explain physically why the coda level for a <u>single</u> large event at any given time into the coda should exceed the level for a <u>single</u> small event as measured at the same relative time. An explanation for the observed increase in coda levels appears to be that large events are, in fact, multiple events, with the nominal period of seismic activity for a given sequence lasting on the order of 1 or 2 minutes (Figure 4). The observation that large-event codas rise for the first 10 to 20 seconds is but one manifestation of the multiple event source. The difference in relative coda levels (~0.14 m_b) is another.

Figures 5 through 7 show the large-event and small-event codas [illegible]ee distance intervals. In each case, the large-event coda has been shifted to an earlier relative time by 1 or 2 minutes. By shifting the codas relative to one another, the codas are brought into coincidence. This indicates that in the case of large events, the significant secondary phases are extended in time and thus appear to arrive late with respect to the onset of the first arrival because they derive from

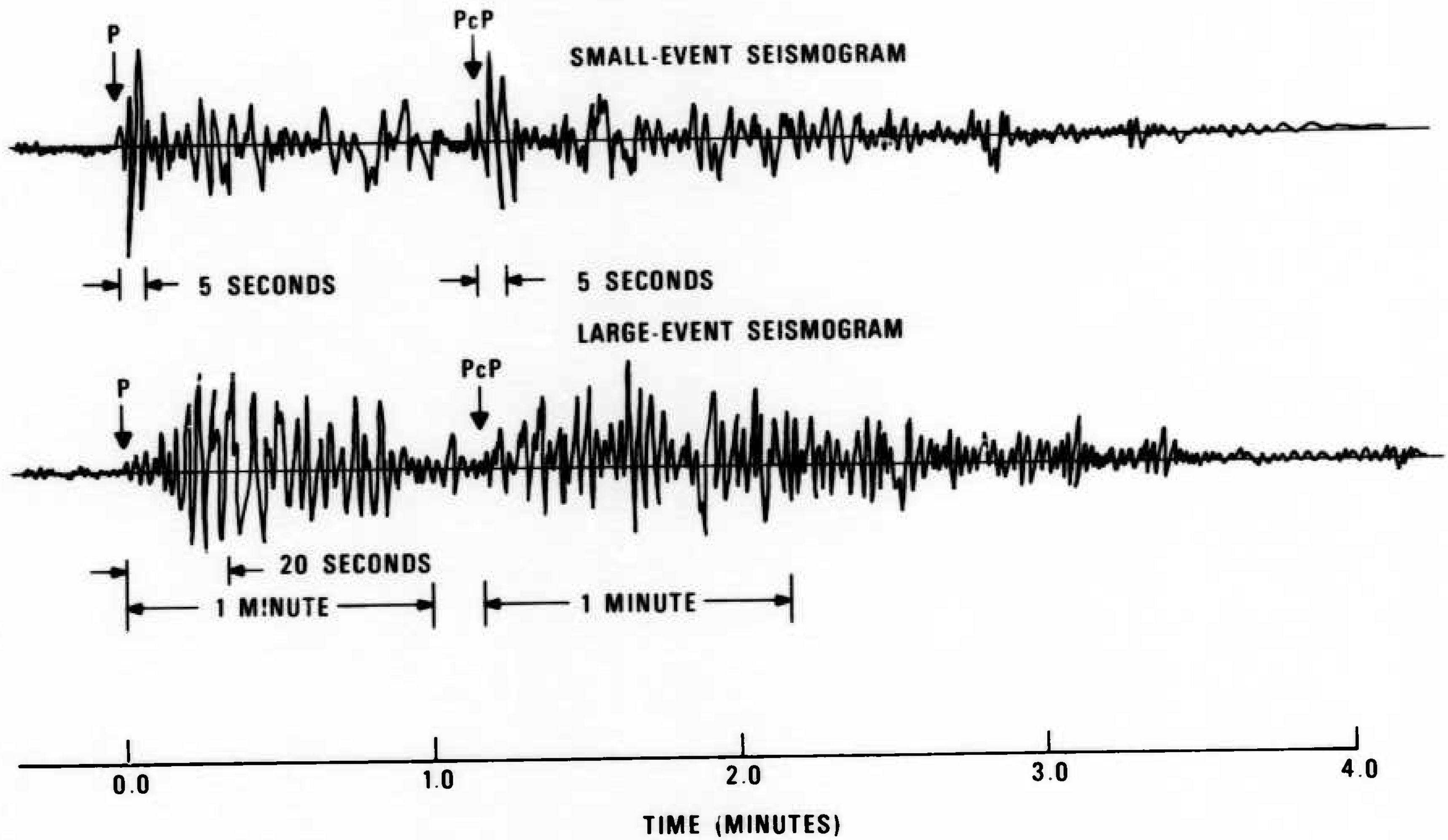


Figure 4. Hypotehtical small-event and large-event seismograms.

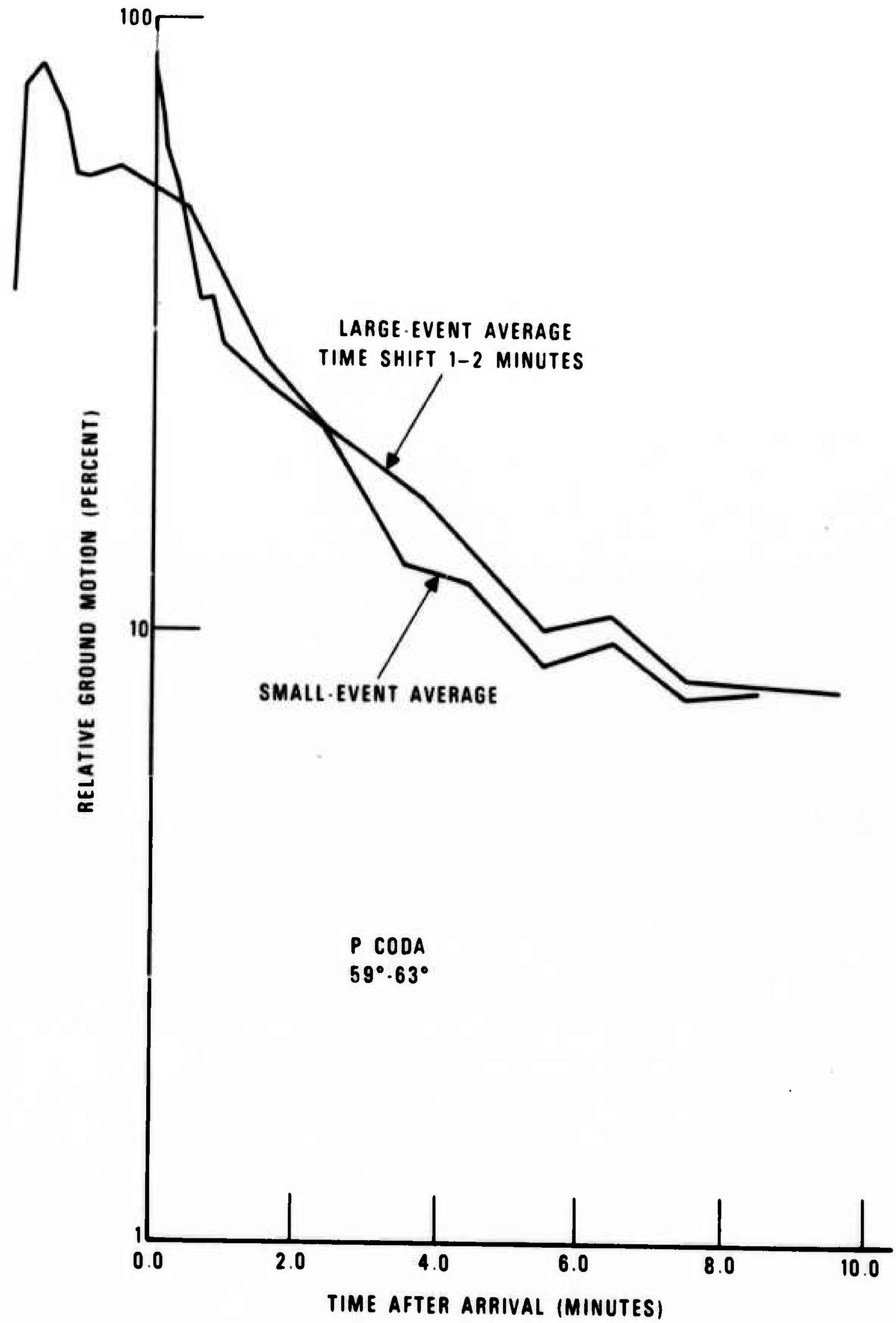


Figure 5. Comparison of time-shifted large-event and small-event codas, 59-63° distance.

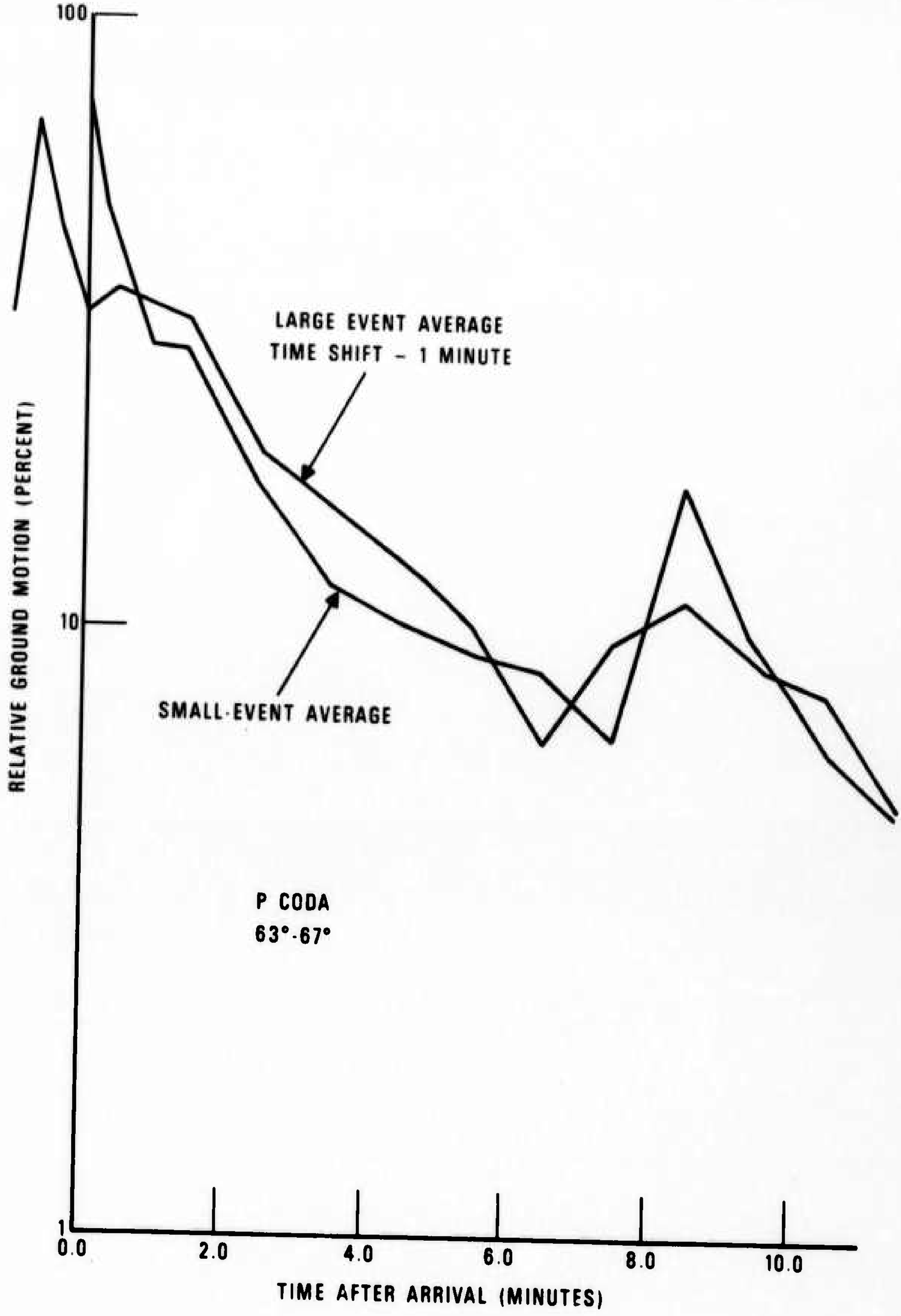


Figure 6. Comparison of time-shifted large-event and small-event codas, 63-67° distance.

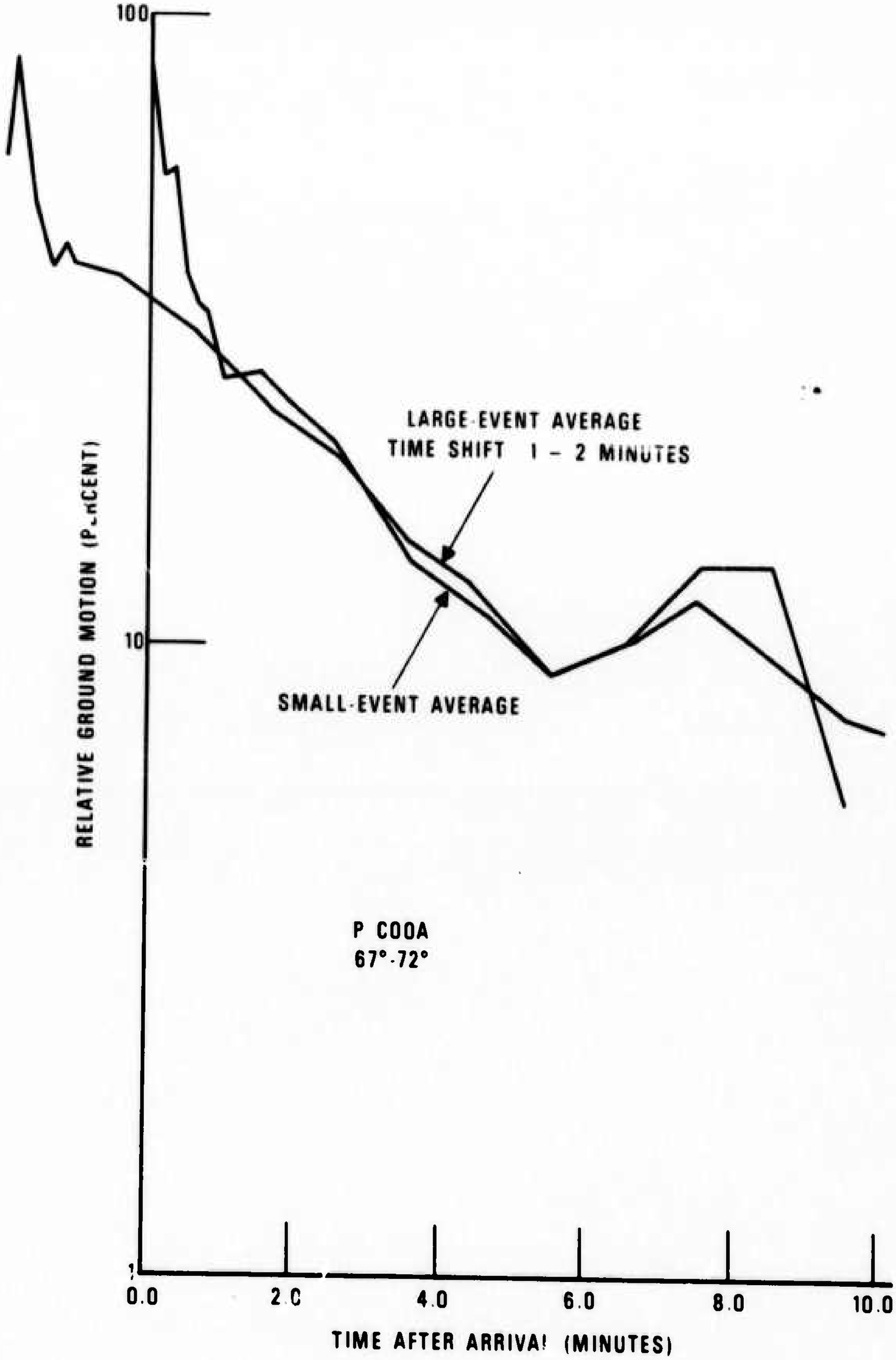


Figure 7. Comparison of time-shifted large-event and small-event codas, 67-72° distance.

events which may occur 1 or 2 minutes following the initial event in the sequence. Note that we cannot resolve the rupture period any better than ±1 minute due to the manner in which we have quantified the coda. Estimates for the time shift associated with each of the coda sets shown in Appendix I are given in Table X. These estimates for the period of source activity, 1 or 2 minutes, are roughly the same as that found by Wyss and Brune (1967) for the Alaskan earthquake of 28 March 1964 (events indicated at 9, 19, 28, 29, 44, and 72 seconds after the initial origin time), and by Trifunac and Brune (1970) for the Imperial Valley, California earthquake of 1940 (4 events in the first 25 seconds, followed by 9 events in the next five minutes). The results presented here suggest that multiple events are a more common phenomenon than has perhaps been generally suspected, and that many, if not all, "large" events (high M_s values) are multiple events. If true, this would have considerable impact on extensions of earthquake source-mechanism theory to large magnitudes.

TABLE X

Time Shifts for Large-Event Coda

DISTANCE INTERVAL (Degrees)	ESTIMATED TIME SHIFT (Minutes)
42-53	-1
53-56	-1
56-59	
59-63	-2
63-67	-1
67-72	-2
72-79	-2
79-84	-2
84-98	-1
98-103	~-1
110-115	
118-127	-2
127-136	
136-140	
140-145	
145-155	-2
155-166	-1

Coda Consistancy - 42° to 103° Distance

Let us now examine the reliability of the distinction between large-event and small-event coda characteristics. That is, although we have established that in a statistical sense large-event codas differ from those of small events, one may ask if all stations within a network will observe the same coda characteristics for a given event. Further, we are also interested in knowing whether an emergent coda necessarily implies displacement of the entire coda by one or two minutes in time. It might be thought, for example, that pP seen at a few stations for a small event could generate an emergent coda according to our definition, but that the coda as a whole would still have the characteristic small-event shape.

Let us first examine the consistancy of the large-event codas. Those few large-event codas which peak in the first 5 seconds (see Table XI for coda determinations) are candidates for an overall coda-shape characteristic of small events. As seen in Table XII, however, of the 10 out of 37 large events for which one or more codas peaked in the first 5 seconds, only two events had 50% or more of their recordings exhibit overall small-event coda characteristics. Thus, it would appear that m_b or $M_s > 7.0$ is a good criterion for selecting events with large-event coda characteristics, and that for such events, most individual stations will exhibit these characteristics. If large events are multiple events, this

TABLE XI

Large-Event Coda Determinations 0-30 Seconds

DATE	LOCATION	STATION	DISTANCE INTERVAL	Relative Coda Measurements (Percent) 0-5 SECONDS	5-10 SECONDS	10-20 SECONDS	20-30 SECONDS
04 Jan 70	Yunan, China	SHI	42-53°	26	85	100*	97
		COP	67-72°	55	90	100*	42
		KON	67-72°	93	100*	83	65
		COL	72-79°	11	41	100*	58
08 Jan 70	Kermadec Islands	PRE	84-98°	45	100*	79	46
		CHG	84-98°	46	51*	21	15
		PEL	84-98°	100*	72	37	16
		TFO	84-98°	100*	70	45	30
10 Jan 70	Philippines	COL	79-84°	53	59	100*	95
20 Jan 70	Tonga-Fiji Islands	COL	84-98°	81	56	84	100*
		PEL	84-98°	35	53	100*	58
		TFO	84-98°	25	45	63*	35
28 Feb 70	Aleutian Islands	TFO	42-53°	100*	90	45	20
		COP	67-72°	81	100*	26	13
		KON	67-72°	60	100*	30	27
		SHI	84-98°	28	62*	36	35
28 Mar 70	Turkey	PRE	63-67°	30	52	100*	56
		COL	72-79°	31	77	100*	53
		TFO	98-103°	30	65*	50	45
7 Apr 70	Philippines	COL	72-79°	34	90	100*	57
		COP	84-98°	95*	70	50	45
		KON	84-98°	100*	61	72	60
		PRE	98-103°	60	75	80	100*
12 Apr 70	Philippines	SHI	63-67°	23	34	100*	86
		COL	72-79°	40	87	100*	72
		COP	84-98°	60	50	100*	70
		KON	84-98°	20	25	35	85*
		PRE	98-103°	25	60	80	100*

*Maximum Relative Amplitude in the Interval 0-30 Seconds

TABLE XI (Cont'd.)

Large-Event Coda Determinations 0-30 Seconds

DATE	LOCATION	STATION	DISTANCE INTERVAL	Relative Coda Measurements (Percent) 0-5 SECONDS	5-10 SECONDS	10-20 SECONDS	20-30 SECONDS
29 Apr 70	Mexico	PEL	42-53°	21	42	100*	86
		KON	79-84°	20	42	100*	45
27 May 70	Bonin Islands	KON	79-84°	100*	70	59	36
		TFO	84-98°	90	100*	42	23
31 May 70	Peru	TFO	53-56°	6	12	42*	36
		KON	84-98°	45	35	50*	50
		COP	98-103°	30*	18	20	26
11 Jun 70	Macquarie Islands	PEL	79-84°	25	30	89	100*
		MAT	84-98°	40	20	40	100*
		PRE	84-98°	15	9	17	100*
15 Jun 70	Falkland Islands	PRE	67-72°	55	90	90	95*
		TFO	84-98°	37	40	57	64*
24 Jun 70	Queen Charlotte Is.	MAT	59-63°	29	99	100*	65
		COP	67-72°	40	65	100*	95
		CHG	84-98°	26	100*	77	97
		SHI	98-103°	60	70*	35	40
25 Jul 70	Japan	COL	56-59°	68	86	100*	61
		SHI	63-67°	31	67	59	100*
		COP	72-79°	52	100*	65	55
		KON	72-79°	50	85	100*	95
		TFO	84-98°	65	90	67	100*
31 Jul 70	Colombia	TFO	42-53°	41*	25	26	32
11 Aug 70	New Hebrides	MAT	56-59°	28	90	100*	56
		CHG	72-79°	19	45	100*	66
		COL	84-98°	13	64	100*	60
		TFO	84-98°	15	50	100*	65
30 Aug 70	Sea of Okhotsk	COP	63-67°	57	100*	35	19
		TFO	67-72°	90	100*	40	22
31 Oct 70	New Guinea	SHI	84-98°	18	14	28	67*

*Maximum Relative Amplitude in the Interval 0-30 Seconds

TABLE XI (Cont'd.)

Large-Event Coda Determinations 0-30 Seconds

DATE	LOCATION	STATION	DISTANCE INTERVAL	Relative Coda Measurements (Percent) 0-5 SECONDS	5-10 SECONDS	10-20 SECONDS	30-30 SECONDS
02 Dec 70	Solomon Islands	CHG	67-72°	54	100*	98	90
		COL	79-84°	77	66	94	100*
		TFO	84-98°	65	62	97	100*
10 Dec 70	Peru-Ecuador	TFO	42-53°	20	80	95*	90
		COP	84-98°	75	100*	85	70
		KON	84-98°	100*	60	65	50
03 Jan 71	South Atlantic Ridge	SHI	84-98°	40	60	80*	60
04 Feb 71	Sumatra	COP	84-98°	55	60	100*	70
02 May 71	Aleutian Islands	TFO	42-53°	20	35	95	100*
		COP	72-79°	60	100*	95	90
		SHI	84-98°	20	54	100*	44
17 Jun 71	Chile	TFO	67-72°	30	100*	50	40
09 Jul 71	Chile	TFO	72-79°	20	40	75*	70
14 Jul 71	New Britain	TFO	84-98°	9	16	32*	24
19 Jul 71	New Britain	MAT	42-53°	13	35	100*	74
		TFO	84-98°	28	45	55	68*
26 Jul 71	New Ireland	TFO	84-98°	3	9	22	45*
		SHI	98-103°	12	44	100*	58
27 Jul 71	Peru-Ecuador	TFO	42-53°	25	50	100*	70
02 Aug 71	Japan	COP	72-79°	75	100*	74	68
		TFO	72-79°	100*	50	30	35
05 Aug 71	Mid-Atlantic Ridge	COP	59-63°	37	80*	60	70
		KON	63-67°	22	60*	50	45
		SHI	72-79°	14	30	64*	55
		TFO	84-98°	34	46	100*	62

*Maximum Relative Amplitude in the Interval 0-30 Seconds

TABLE XI (Cont'd.)

Large-Event Coda Determinations 0-30 Seconds

DATE	LOCATION	STATION	DISTANCE INTERVAL	Relative Coda Measurements (Percent) 0-5 SECONDS	5-10 SECONDS	10-20 SECONDS	30-30 SECONDS
5 Sep 71	Sakhalin Island	COP	67-72°	40	100*	90	30
		SHI	67-72°	49	95	34	100*
		TFO	72-79°	29	36	100*	50
14 Sep 71	New Britain	MAT	42-53°	28	100*	45	37
		SHI	98-103°	100*	85	85	60
		TFO	98-103°	36	24	41*	40
21 Nov 71	Santa Cruz Islands	MAT	53-63°	62	100*	82	67
		TFO	84-98°	41*	40	38	25
24 Nov 71	Kamchatka	TFO	59-63°	50	80	100*	90
15 Dec 71	Kamchatka	TFO	59-63°	20	60	82	100*
		COP	63-67°	40	24	100*	65

*Maximum relative amplitude in the interval 0-30 seconds

TABLE XII

Large Events with Maximum Relative Amplitude between 0 and 5 Seconds*

DATE	LOCATION	NOS m_b	NO. OBSERVATIONS WHICH PEAK IN FIRST 5 SECONDS	NO. POSSIBLE OBSERVATIONS	STATIONS AT WHICH OBSERVATIONS PEAK IN FIRST 5 SECONDS
08 Jan 70	Kermadec Is.	6.1	2	3	PEL(S) TFO(S)
28 Feb 70	Aleutian Is.	6.1	1	4	TFO(S)
07 Apr 70	Philippine Is.	6.4	2	4	COP(L) KON(S)
27 May 70	Bonin Is.	6.2	1	2	KON(L)
31 May 70	Peru	6.6	1	3	COP(S)
31 Jul 70	Columbia	7.1	1	1	TFO(L)
10 Dec 70	Peru	6.3	1	3	KON(L)
26 Jul 71	New Ireland	6.3	1	1	SHI(L)
02 Aug 71	Japan	6.6	1	2	TFO(L)
21 Nov 71	Santa Cruz Is.	6.4	1	2	TFO(S)

TOTALS:

Number of Events: 10

Number of Event-Station Pairs: 12

Number of Events for Which 50% or more of the observations for a given event peak in the first 5 seconds of the coda: 7

(L) Large-event coda characteristics

(S) Small-event coda Characteristics

* Only interval 0-30 seconds considered

is not surprising. The occasional reading which has a maximum in the first 5 seconds might be explained by a node in the radiation pattern of the first few seconds of an aftershock.

Turning now to the consistancy of the small-event ($m_b \leq 5.8$) codas, let us particularly examine the subset of these events which has a maximum between 5 and 30 seconds into the record (see Table XIII for coda determinations). There are 43 such events out of a total of 118, but Table XIV shows that all but 9 of these can be traced to pP or PcP phases. Of the 24 event-station records available from these 9 events, 16 have the characteristic large-event coda shape, suggesting that they are indeed small, multiple events. On the other hand, the records from the 23 pP events show that, in general, their overall character is that of small-events. Thus even if an event has a $m_b \leq 5.8$, it is possible for it to be a multiple event, with a characteristic multiple-event coda shape. Table XV summarizes the causes for small-events to exhibit large-event coda characteristics.

It might be noted that a fairly sophisticated seismic analysis would be required to select out these few small events on the basis of the shape of the first few seconds of recordings at one or two stations. Not only might the initial shape be due to pP but also, several of the small multiple events show individual recordings which peak in the first 5 seconds, again due possibly to the effect of radiation patterns on the aftershocks.

TABLE XIII

Small-Event Coda Determinations

0-30 Seconds

DATE	AREA	STATION	DISTANCE INTERVAL	RELATIVE CODA MEASUREMENTS (PERCENT) 0-5 SECONDS	5-10 SECONDS	10-20 SECONDS	20-30 SECONDS
12 Jan 64	Iran-Turkey	CHG	42-53°	100*	74	60	47
19 Aug 64	Iran-Turkey	SEO	42-53°	40	100*	98	67
		SEO	59-63°	85	100*	77	35
19 Aug 64	Iran-Turkey	CHG	59-63°	87	100*	55	27
20 Aug 64	Iran-Turkey	SEO	42-53°	98	86	100*	65
		BOZ	59-63°	75	100*	70	27
02 Feb 65	Tadzhik-Hindu Kush	DAL	84-98°	100*	75	65	70
05 Apr 65	Turkey-Greece	SEO	84-98°	85	50	[illegible]	85
[illegible] Apr 65	Alaska	SEO	42-53°	100*	50	[illegible]	50
27 Apr 65	Turkey-Greece	MAT	72-79°	100*	90	60	45
04 Aug 65	Solomons-New Hebrides	MAT	56-59°	100*	40	32	20
11 Aug 65	Alaska	MAT	42-53°	72	100*	75	56
13 Aug 65	Solomons-New Hebrides	MAT	56-59°	68	100*	65	49
14 Aug 65	Solomons-New Hebrides	MAT	56-59°	52	100*	75	80
17 Aug 65	Sumatra-Java	MAT	42-53°	40	55	100*	90
		SHI	52-53°	70	100*	64	49
17 Aug 65	Solomons-New Hebrides	MAT	42-53°	100*	90	75	65
21 Aug 65	Sumatra-Java	SHI	59-63°	100*	60	72	60
02 Sep 65	Aleutian Islands	CHG	63-67°	100*	26	45	49
14 Sep 65	Philippines-Taiwan	CMC	84-98°	90	85	65	100*
19 Sep 65	Tonga Is.-Fiji Is.	MAT	72-79°	68	100*	75	65
08 Oct 65	Sumatra-Java	SHI	59-63°	100*	80	95	70
19 Oct 65	Aleutian Islands	CHG	63-67°	100*	79	43	50
23 Oct 65	Aleutian Islands	CHG	72-79°	100*	35	50	35
02 Nov 65	Sumatra-Java	MAT	53-56°	100*	60	45	40
22 Nov 65	Aleutian Islands	CHG	67-72°	100*	15	30	20
23 Nov 65	Aleutian Islands	CHG	67-72°	100*	50	75	80
08 Jan 66	Japan	CMC	59-63°	100*	60	20	20
		BOZ	72-79°	100*	62	33	25
16 Jan 66	Kamchatka-Kuriles	CHG	59-63°	66	100*	62	35
		SHI	72-79°	100*	45	45	40
22 Jan 66	Alaska	WES	42-53°	55	50	100*	45
		SEO	53-56°	53	100*	82	30
		KON	59-63°	80	75	100*	70
		DAV	72-79°	50	100*	60	99
		CHG	79-84°	100*	54	70	74
		NDI	84-98°	60	40	100*	35
		SHI	84-98°	80	100*	80	90
24 Jan 66	Tadzhik-Hindu Kush	KON	42-53°	100*	70	60	60
		SEO	42-53°	100*	35	45	30
		DAV	56-59°	100*	70	75	50
		MAL	59-63°	100*	90	90	95
		CMC	79-84°	100*	68	84	65
28 Jan 66	Tadzhik-Hindu Kush	MAT	42-53°	100*	80	60	65
		CMC	72-79°	100*	75	35	38
28 Jan 66	Kamchatka-Kuriles	SHI	72-79°	100*	51	52	52
29 Jan 66	Kamchatka-Kuriles	CHG	42-53°	68	35	100*	40
31 Jan 66	China-Nepal-Burma	CMC	79-84°	100*	60	60	30
02 Feb 66	Tadzhik-Hindu Kush	MAT	42-53°	100*	40	55	50
05 Feb 66	Turkey-Greece	NDI	42-53°	64	100*	65	50
		WES	63-67°	100*	60	45	30
		CMC	67-72°	50	100*	57	43
		BOZ	84-98°	100*	56	45	47
		DAL	84-98°	80	100*	31	30
05 Feb 66	Kamchatka-Kuriles	BOZ	56-59°	100*	28	24	12
		NDI	59-63°	100*	25	36	24
		KON	63-67°	100*	40	35	42
		DAL	72-79°	100*	95	45	85
		IST	72-79°	100*	44	40	33
		WES	79-84°	100*	56	20	15
		MAL	84-98°	100*	50	50	40
10 Feb 66	Kamchatka-Kuriles	CHG	42-53°	100*	21	19	10
13 Feb 66	China-Nepal-Burma	SHI	42-53°	80	85	100*	60
		IST	59-63°	100*	65	35	37
		ADE	67-72°	100*	50	44	21
		CMC	79-84°	100*	64	48	31
18 Feb 66	Japan	CHG	42-53°	100*	48	43	23
28 Feb 66	Japan	CMC	53-56°	100*	23	19	16
		BOZ	67-72°	100*	37	61	26
		IST	72-79°	100*	45	50	45

TABLE XIII (Cont'd.)

Small-Event Coda Determinations

0-30 Seconds

DATE	AREA	STATION	DISTANCE INTERVAL	RELATIVE CODA MEASUREMENTS (PERCENT) 0-5 SECONDS	5-10 SECONDS	10-20 SECONDS	20-30 SECONDS
06 Mar 66	China-Nepal-Burma	CMC	79-84°	100*	95	55	25
07 Mar 66	Iran-Turkey	CMC	72-79°	45	75	100*	80
		BO2	84-98°	100*	73	60	50
19 Mar 66	Kamchatka-Kuriles	CHG	42-53°	50	47	91	100*
20 Mar 66	Tonga Is.-Fiji Is.	CMC	84-98°	100*	35	30	15
31 Mar 66	Tadzhik-Hindu Kush	CMC	72-79°	100*	17	21	14
		BOZ	98-103°	50*	35	25	20
09 Apr 66	Central America	BO2	42-53°	40	100*	55	45
		CMC	59-63°	55	100*	38	42
		KON	79-84°	100*	90	100	60
11 Apr 66	Central America	CMC	42-53°	100*	27	77	42
		KON	84-98°	100*	47	35	20
16 Apr 66	Alaska	DAL	42-53°	70	100*	70	80
		WES	42-53°	55	50	100*	60
		KON	59-63°	100*	40	88	70
		IST	79-84°	100*	50	70	40
		CHG	79-84°	100*	40	68	68
		SHI	84-98°	100*	65	95	80
20 Apr 66	Iran-Turkey	SEO	59-63°	70	100*	63	90
		BO2	84-98°	50	78	100*	80
09 May 66	Turkey-Greece	NDI	42-53°	65	46	100*	55
		CMC	72-79°	30	30	75	100*
		SEO	72-79°	90	100*	88	45
		WES	72-79°	80	100*	90	70
11 May 66	Kamchatka-Kuriles	SHI	72-79°	67	100*	93	60
		IST	79-84°	65	50	100*	75
15 May 66	Aleutian Islands	CHG	67-72°	100*	54	54	52
04 Jun 66	Tadzhik-Hindu Kush	KON	42-53°	100*	23	20	16
		BO2	98-103°	100*	50	45	38
10 Jun 66	China-Nepal-Burma	CMC	63-67°	100*	60	40	30
21 Jun 66	Kamchatka-Kuriles	CMC	42-53°	25	25	100*	40
		KON	67-72°	100*	70	95	65
		WES	72-79°	100*	30	65	50
27 Jun 66	China-Nepal-Burma	KON	53-56°	100*	90	82	80
		ADE	84-98°	30	60	100*	45
10 Jul 66	Tonga Is.-Fiji Is.	MUN	56-59°	100*	47	30	27
		[illegible]	84-98°	100*	50	95	55
01 Aug 66	Tadzhik-Hindu Kush	KON	42-53°	70	100*	95	35
		SEO	42-53°	50	100*	45	40
		MAT	56-59°	60	90	100*	90
		MAL	59-63°	86	100*	83	54
01 Aug 66	Tadzhik-Hindu Kush	WES	98-103°	100*	80	90	70
10 Aug 66	Tonga Is.-Fiji Is.	ADE	42-53°	100*	88	85	50
		MUN	59-63°	100*	47	30	27
		SEO	79-84°	100*	55	45	40
		BO2	84-98°	53	45	22	100*
		CHG	84-98°	100*	34	16	22
10 Aug 66	Tadzhik-Hindu Kush	BO2	84-98°	100*	70	55	40
15 Aug 66	Alaska	CHG	84-98°	97	100*	50	40
16 Aug 66	Tadzhik-Hindu Kush	MAL	56-59°	100*	40	55	40
20 Aug 66	Japan	CMC	53-56°	100*	24	32	22
		BO2	67-72°	100*	74	47	23
20 Aug 66	Turkey-Greece	CHG	67-72°	100*	52	59	31
		BO2	79-84°	100*	30	25	31
28 Aug 66	Tonga Is.-Fiji Is.	MUN	42-53°	100*	27	27	20
		CHG	84-98°	100*	38	43	32
		SEO	84-98°	100*	20	27	12
07 Oct 66	Alaska	MAT	42-53°	100*	50	35	30
		SEO	53-56°	100*	50	50	50
		IST	72-79°	100*	40	50	60
		CHG	79-84°	100*	52	43	35
		NDI	79-84°	100*	42	47	33
		SHI	84-98°	95	50	100*	66
29 Oct 66	Turkey-Greece	NDI	42-53°	100*	73	25	23
		WES	67-72°	77	80	100*	62
		BO2	84-98°	100*	58	60	65
		DAL	84-98°	100*	57	40	27
12 Nov 66	Japan	NDI	53-56°	100*	43	45	26
		BO2	67-72°	30	30	100*	44
		KON	67-72°	100*	45	70	55
		SHI	72-79°	100*	73	71	55
		WES	84-98°	100*	80	100	95

TABLE XIII (Cont'd.)

Small-Event Coda Determinations

0-30 Seconds

DATE	AREA	STATION	DISTANCE INTERVAL	RELATIVE CODA MEASUREMENTS (PERCENT) 0-5 SECONDS	5-10 SECONDS	10-20 SECONDS	20-30 SECONDS
07 Dec 66	Kamchatka-Kuriles	CMC	42-53°	100*	27	40	23
		NDI	59-63°	100*	42	45	38
		KON	67-72°	60	70	45	100*
		SHI	72-79°	75	41	59	100*
		WES	84-98°	100*	30	60	28
11 Jan 67	Iran-Turkey	SEO	63-67°	100*	79	33	40
		CMC	72-79°	100*	66	41	42
		WES	84-98°	100*	50	38	31
25 Jan 67	Tadzhik-Hindu Kush	MAT	42-53°	100*	26	39	22
07 Feb 67	Alaska	MAT	42-53°	100*	45	74	61
09 Feb 67	Turkey-Greece	NDI	42-53°	100*	70	95	95
		CMC	67-72°	100*	55	50	25
		CHG	67-72°	100*	50	40	40
20 Feb 67	Tadzhik-Hindu Kush	KON	42-53°	100*	70	45	40
		MAT	42-53°	100*	75	67	38
		SEO	42-53°	55*	35	35	30
		DAV	53-56°	100*	60	50	50
		CMC	72-79°	100*	60	32	30
04 Mar 67	Tonga Is.-Fiji Is.	MAT	67-72°	100*	47	58	44
		CMC	84-98°	100*	25	30	15
01 May 67	Turkey-Greece	NDI	42-53°	63	94	100*	27
		WES	63-67°	30	100*	63	29
		CMC	67-72°	35	100*	70	30
		SEO	72-79°	45	50	100*	40
		MAT	79-84°	30	100*	95	41
		BOZ	84-98°	25	100*	91	48
27 May 67	Tadzhik-Hindu Kush	BOZ	98-103°	40	90*	45	55
21 Jun 67	Alaska	MAT	42-53°	50	100*	85	75
26 Jul 67	Iran-Turkey	CHG	53-56°	100*	65	54	87
		MAT	72-79°	100*	100	58	50
30 Jul 67	Turkey-Greece	CHG	59-63°	100*	92	78	35
		CMC	67-72°	70	100*	25	28
		SEO	67-72°	100*	40	60	40
		WES	67-72°	100*	85	80	35
		MAT	79-84°	90	100*	70	60
15 Aug 67	China-Nepal-Burma	AQU	59-63°	100*	90	48	50
		ADE	72-79°	100*	95	55	15
28 Sep 67	Alaska	MAT	42-53°	100*	27	62	51
03 Oct 67	Central America	CMC	59-63°	100*	40	63	33
		AQU	84-98°	30	40	30	50*
02 Dec 67	Turkey-Greece	MAT	79-84°	100*	70	43	35
10 Dec 67	Calif.-Western U.S.	KON	72-79°	58	82	100*	60
		MAL	84-98°	45	100*	73	35
28 Mar 68	Turkey-Greece	SEO	72-79°	70	100*	85	80
		MAT	84-98°	67	100*	75	68
15 Jun 68	Japan	KBL	56-59°	100*	53	85	59
17 Jun 68	Solomons-New Hebrides	KBL	98-103°	100*	55	65	80
27 Jun 68	Sumatra-Java	KBL	53-56°	56	100*	50	44
27 Jun 68	Sumatra-Java	KBL	63-67°	100*	65	78	86
02 Jul 68	Solomons-New Hebrides	KBL	72-79°	55*	47	37	34
02 Jul 68	Japan	KBL	42-53°	100*	53	77	82
28 Jul 68	Kamchatka-Kuriles	KBL	63-67°	75	100*	75	70
28 Jul 68	Kamchatka-Kuriles	KBL	63-67°	70	100*	77	47
14 Aug 68	Kamchatka-Kuriles	KBL	63-67°	100*	36	36	24
18 Aug 68	Kamchatka-Kuriles	KBL	63-67°	96	100*	76	78
08 Sep 68	Kamchatka-Kuriles	KBL	59-63°	100*	35	25	24
20 Sep 68	Japan	KBL	53-56°	100*	70	52	58
28 Sep 68	Philippines-Taiwan	KBL	42-53°	100*	73	50	29
03 Oct 68	Aleutian Islands	KBL	72-79°	100*	22	37	30
23 Oct 68	Sumatra-Java	KBL	56-59°	100*	76	72	46
29 Oct 68	Japan	KBL	59-63°	100*	70	79	58
07 Nov 68	Aleutian Islands	KBL	79-84°	51	100*	4[illegible]	50
07 Nov 68	Kamchatka-Kuriles	KBL	59-63°	100*	32	34	27
11 Nov 68	Alaska	KBL	79-84°	100*	46	26	19
15 Nov 68	Alaska	KBL	79-84°	100*	75	93	60
27 Nov 68	Alaska	KBL	79-84°	100*	52	65	25
07 Dec 68	Aleutian Islands	KBL	72-79°	100*	90	73	60
07 Dec 68	Aleutian Islands	KBL	72-79°	65	100*	62	65
19 Dec 68	Kamchatka-Kuriles	KBL	63-67°	100*	95	58	66
01 Jan 69	Aleutian Islands	KBL	72-79°	96	100*	71	39
05 Jan 69	Philippines-Taiwan	KBL	59-63°	30	50	80	100*
19 Jan 69	Philippines-Taiwan	KBL	63-67°	100*	28	20	18
20 Jan 69	Solomons-New Hebrides	KBL	98-103°	28	60*	48	35
21 Jan 69	Philippines-Taiwan	KBL	67-72°	100*	56	52	44
10 Feb 69	Kamchatka-Kuriles	KBL	59-63°	100*	27	32	25
10 Mar 69	Solomons-New Hebrides	KBL	79-84°	100*	56	40	27
20 Mar 69	Philippines-Taiwan	KBL	56-59°	100*	63	55	40

TABLE XIV

Small Events with Maximum Relative Amplitude Between 5 and 30 Seconds*

DATE	LOCATION	NOS m_b	NO. OBSERVATIONS WHICH PEAK BETWEEN 5-30 SEC	NO. POSSIBLE OBSERVATIONS	CAUSE OF GROWTH	STATIONS AT WHICH OBSERVATIONS PEAK BETWEEN 5 and 30 SEC.
19 Aug 64(09:33)	Iran-Turkey	5.6	2	2	pP	CHG(S),SEO(S)
19 Aug 64(15:20)	Iran-Turkey	5.6	1	1	pP	SEO(S)
20 Aug 64	Iran-Turkey	5.5	2	2	pP	CHG(S),SEO(S)
05 Apr 65	Turkey-Greece	5.7	1	1	pP	DAL(S)
11 Aug 65	Alaska	5.5	1	1	pP	MAT(S)
13 Aug 65	Solomon Is.	5.7	1	1	pP	MAT(L)
14 Aug 65	Solomon Is.	5.5	1	1	pP	MAT(L)
17 Aug 65(10:35)	Sumatra-Java	5.3	2	2	pP	MAT(L),SHI(L)
16 Jan 66	Kamchatka-Kuriles	5.6	1	2	pP	CHG(L)
22 Jan 66	Alaska	5.8	6	7	Multiple	DAV(L),KON(S),NDI(S), SEO(S),SHI(L),WES(L)
29 Jan 66	Kamchatka-Kuriles	5.1	1	1	pP	CHG(S)
05 Feb 66	Turkey-Greece	5.8	3	5	pP	CMC(S),DAL(S),NDI(S)
13 Feb 66	China-Burma	5.7	1	4	pP	SHI(S)
07 Mar 66	Iran-Turkey	5.6	1	2	PcP	CMC(L)
19 Mar 66	Kamchatka-Kuriles	5.6	1	1	Multiple	CHG(S
09 Apr 66	Central America	5.7	2	3	pP	BOZ(L),CMC(S)
16 Apr 66	Alaska	5.2	2	6	Multiple	DAL(L),WES(S)
20 Apr 66	Iran-Turkey	5.5	2	2	Multiple	BOZ(L),SEO(S)
09 May 66	Turkey-Greece	5.5	3	4	Multiple	CMC(L),NDI(L),SEO(L)
11 May 66	Kamchatka-Kuriles	5.8	2	2	PcP	IST(L),SHI(S)
21 Jun 66	Kamchatka-Kuriles	5.8	1	3	Multiple	CMC(L)
27 Jun 66(10:40)	China-Burma	5.8	1	2	pP	ADE(S)
01 Aug 66(19:09)	Tadzhik-Hindu Kush	5.8	4	4	pP	KON(S),MAL(S),MAT(L), SEO(S)
10 Aug 66(05:13)	Tonga Is.-Fiji Is.	5.8	1	4	pP	BOZ(S)
07 Oct 66	Alaska	5.7	1	6	pP or PcP	SHI(S)
29 Oct 66	Turkey-Greece	5.7	1	4	PcP	WES(L)
12 Nov 66	Japan	5.8	1	5	PcP	BOZ(S)
07 Dec 66	Kamchatka-Kuriles	5.8	2	5	PcP	KON(S),SHI(S)
01 May 67	Turkey-Greece	5.6	6	6	pP	BOZ(S),CMC(S),MAT(S), N[illegible]I(S),SEO(S),WES(S)
27 May 67	Tadzhik-Hindu Kush	5.4	1	1	pP	BOZ(L)
21 Jun 67	Alaska	5.4	1	1	pP	MAT(L)
30 Jul 67	Turkey-Greece	5.6	2	4	pP	CMC(S),MAT(L)
03 Oct 67	Central America	5.8	1	2	Multiple	AQU(L)
10 Dec 67	Calif.-West. U.S.	5.8	2	2	PcP	KON(L),MAL(S)
12 Nov 66	Japan	5.8	1	5	PcP	BOZ(S)
28 Mar 68	Turkey-Greece	5.4	2	2	PcP	SEO(S),MAT(L)
27 Jun 68(22:10)	Sumatra-Java	5.3	1	1	Multiple	KBL(L)
28 Jul 68(21:12)	Kamchatka-Kuriles	5.4	1	1	pP	KBL(L)
28 Jul 68(21:23)	Kamchatka-Kuriles	5.1	1	1	pP	KBL(L)
07 Nov 68	Aleutians	5.1	1	1	pP or PcP	KBL(L)
07 Dec 68(15:46)	Aleutians	5.0	1	1	pP or PcP	KBL(L)
01 Jan 69	Aleutians	5.4	1	1	pP or PcP	KBL(S)
05 Jan 69	Philippines	5.3	1	1	Multiple	KBL(L)
20 Jan 69	Solomon Is.	5.6	1	1	pP	KBL(L)

*Only Interval 0-30 Seconds Considered

Totals:

Number of Events: 43
Number of Event-Station Pairs: 71
Number of Events for which 50% or more of the observations peak in the interval 5-30 seconds: 35

TABLE XV

Summary of Causes for Small-Events to Exhibit
Large-Event (Emergent) Coda Characteristics in the First 30 Seconds

Type of Phase of Event Causing Coda to Peak at > 5 Sec.	Number of Events for Which Coda at One or More Stations Peaked at > 5 Sec./Number of These Events for Which the Coda at One or More Stations Exhibited Large-Event Coda Characteritstics	Number of Events for Which Coda at One or More Stations Peaked at > 5 Sec. and Exhibited > 0.3 m_b Growth/Number of Events for Which the Coda at One or More Stations Exhibited Large-Event Coda Characteristics	Number of Events for Which Coda at One or More Stations Peaked at > Sec., and Exhibited > 0.2 m_b Growth/Number of Events for Which the Coda at One or More Stations Exhibited Large-Event Coda Characteristics
pP	23/11	10/5	12/7
PcP	7/6	2/1	4/2
pP and/or PcP (not possible to determine phase responsible)	4/2	----	1/1
Multiple event	9/8	6/5	8/7
Totals:			
(pP,PcP, or multiple event)	43/27	18/11	25/17

TABLE XVI

Percentage of Stations Showing Increasing Coda Amplitudes
Given That a Certain Percentage of Stations Observe an Increase

Class of Events Analyzed	Minimum Percentage of Stations Showing a Given Type of Increase (2 or More Stations)	Percentage of Stations Showing Increase	No. of Events Analyzed	Percentage of Stations Showing 0.2 m_b Increase	No. of Events Analyzed	Percentage of Stations Showing 0.3 m_b Increase	No. of Events Analyzed
ALL	50	84	43	78	29	79	20
SMALL	50	78	17	63	9	57	5
LARGE	50	88	26	84	20	87	15
ALL	60	93	34	92	19	89	15
SMALL	60	91	12	89	3	83	1
LARGE	60	94	22	93	16	89	14
ALL	70	98	29	97	16	95	12
SMALL	70	96	10	100	2	83	1
LARGE	70	99	19	97	14	96	11

TABLE XVII

Percentage of Stations Showing Decreasing Coda Amplitudes
Given That a Certain Percentage of Stations Observed A Decrease

Class of Events Analyzed	Minimum Percentage of Stations Showing A Decrease In Relative Coda Amplitudes	Percentage of Stations Showing a Decrease	Number of Events Analyzed
ALL	50	82	35
SMALL	50	85	31
LARGE	50	54	4
ALL	60	90	28
SMALL	60	91	27
LARGE	60	67	1
ALL	70	95	23
SMALL	70	95	23
LARGE	70	--	0

Another way of looking at the consistancy of the coda for small and large events is given in Tables XVI and XVII. In Table XVI we see that if at least 50% of the stations recording a large event show an increase between 5 seconds and 30 seconds, then the expected percentage to show an increase is 88%. Further, Table XVII shows that if 50% of the stations recording a small event show a decrease, then 85% will show a decrease.

Another topic of interest is analyzed in Table XVIII, which shows that the large-event m_b values are probably underestimated by about 0.3 m_b units. Evernden (1970) has pointed out that the disagreement between regional seismicity curves plotted as function of M_s and m_b can be explained, at least in part, by the observation that large events are multiple events. That is, because large-event body wave magnitudes are underestimated by the conventional m_b computational procedure, so too must be the number of large-events. Thus, seismicity curves derived from short-period magnitude data probably dip too steeply at the higher magnitudes ($m_b > 5.8$). It also follows that such charts should show an overabundance of events at moderate magnitudes.

TABLE XVIII

Emergent Character of Large Events

From Average Coda Determinations

DISTANCE INTERVAL (DEGREES)	ZERO-TIME AMPLITUDE* (PERCENT)	ZERO-TIME AMPLITUDE* (LOG_{10})	AMPLITUDE AT 20-SECONDS ELAPSED TIME** (PERCENT)	AMPLITUDE AT 20-SECONDS ELAPSED TIME** (LOG_{10})	DIFFERENCE IN LOG_{10} VALUES (m_b)
42-53	28	1.447	72	1.857	0.410
53-56	20	1.301	59	1.771	0.470
56-59	44	1.643	100	2.000	0.357
59-63	33	1.518	84	1.924	0.406
63-67	32	1.505	69	1.839	0.334
67-72	59	1.771	60	1.778	0.007
72-79	35	1.554	82	1.914	0.360
79-84	46	1.663	87	1.940	0.277
84-98	36	1.556	55	1.740	0.184
98-103	37	1.568	55	1.740	0.172
				AVERAGE	0.300

*Read in the 0-5 Second Time Window
**Read in the 10-20 Second Time Window

Average Coda Determinations

Because the relative coda level at a given time after arrival onset is a function of magnitude, the large-event and small-event coda populations should not be combined to produce a single comprehensive set of average coda determinations. Rather, two sets of coda determinations will be given, one each for what have been defined as "large" and "small events".

For "small" events, the average P and PKP coda, (solid line) together with their corresponding standard deviations of the individual coda observations (dashed lines) are shown in Appendix II. Note that only the data for 0-10° distance includes the surface-wave coda envelope. These data are included here because surface waves at these distances may be of such character as to mask short-period arrivals which might be present in the surface-wave arrival.

The average P and PKP coda and corresponding standard deviations of the individual coda observations for large events are shown in Appendix III.

Coda Prediction - Preliminary Method

Up to now we have defined a small event as one having an $m_b \leq 5.8$, and a large event as one having an m_b or $M_s \geq 7.0$. Obviously, many intermediate events satisfy neither of these criteria. Let us therefore examine possible coda-classification criteria for intermediate events based on the concept of coda growth. Again, Tables XI and XIII show the large-event and small-event coda determinations, respectively, for the first 30 seconds of the P-wave arrivals (42 to 103° distance). We first examine the requirement that for an intermediate-sized event to be classified as a "large" event, relative coda amplitudes must grow by at least 0.3 m_b units between 5 and 30 seconds after the P-wave arrival as compared to the amplitude measured in the first 5 seconds. As seen from Table XIX, 16 large events (i.e. 43%) from our population of 37 have 50% or more observations for a given event which fail to satisfy the 0.3 m_b classification criterion. This would suggest that application of this criterion would successfully select only 56% of the intermediate events of "large" coda type.

To further evaluate event classification, an analysis of the small-event codas using the 0.3 m_b classification criterion is given in Table XX. We see that the codas for 10 events out of 118 have 50% or more observations which satisfy the 0.3 m_b criterion; that is, using this criterion, 8% of our

TABLE XIX

Large Events for Which One or More Observations Fail to Satisfy the 0.3 m_b Classification Criterion

DATE	LOCATION	NOS m_b	NUMBER OF OBSERVATIONS WHICH FAIL TO SATISFY 0.3 m_b CRITERION	NUMBER OF POSSIBLE OBSERVATIONS	STATIONS AT WHICH OBSERVATIONS FAIL TO MEET 0.3 m_b CRITERION
04 Jan 70	China	5.9	2	5	COP(L),KON(L)
08 Jan 70	Kermadec Is.	6.1	1	3	CHG(L)
10 Jan 70	Philippines	6.1	1	1	COL(L)
20 Jan 70	Tonga Is.-Fiji Is.	6.5	1	3	COL(L)
28 Feb 70	Aleutian Is	6.1	2	4	COP(S)KON(S)
07 Apr 70	Philippines	6.4	1	4	PRE(L)
12 Apr 70	Philippines	5.9	1	5	COP(L)
27 May 70	Bonin Is.	6.2	1	2	TFO(S)
31 May 70	Peru	6.6	1	3	KON(L)
15 Jun 70	Falkland Is.	5.6	2	2	PRE(L),TFO(L)
24 Jun 70	Queen Charlotte Is.	5.6	1	4	SHI(L)
25 Jul 70	Japan	6.1	3	5	COL(L),COP(L),TFO(L)
30 Aug 70	Sea of Okhotsk	6.6	2	2	COP(S),TFO(S)
02 Dec 70	Solomon Is.	5.8	3	3	CHG(L),COL(L),TFO(L)
10 Dec 70	Peru	6.3	1	3	COP(L)
04 Feb 71	Sumatra	6.3	1	1	COP(L)
02 May 71	Aleutian Is.	6.0	1	3	COP(L)
02 Aug 71	Japan	6.6	1	2	COP(S)
14 Sep 71	New Britain	6.1	1	3	TFO(S)
21 Nov 71	Santa Cruz Is.	6.4	1	2	MAT(L)

(L) Has a Large-Event Coda Shape

(S) Has a Small-Event Coda Shape

TOTALS:

Number of Events: 20

Number of Event-Station Pairs: 28

Number of Events for Which 50% or More of the Observations for a Given Event Fail to Satisfy the 0.3 m_b Classification criterion (Includes Events From Table XIV): 16

TABLE XX

Small Events that Satisfy the 0.3 m_h Classification Criterion

DATE	LOCATION	NOS m_b	NO. OBSERVATIONS WHICH SATISFY 0.3 m_b CRITERION	NUMBER OF POSSIBLE OBSERVATIONS	STATIONS AT WHICH OBSERVATIONS SATISFY 0.3 m_h CRITERION
19 Aug 64(09:33)	Iran-Turkey	5.6	1	2	CHG(S)
17 Aug 65	Sumatra-Java	5.3	1	2	MAT(L)
22 Jan 66	Alaska	5.8	1	7	DAV(L)
05 Feb 66	Turkey-Greece	5.8	1	5	CMC(S)
07 Mar 66	Iran-Turkey	5.5	1	2	CMC(L)
19 Mar 66	Kamchatka-Kuriles	5.6	1	1	CHG(S)
09 Apr 66	Central America	5.7	1	3	BOZ(L)
20 Apr 66	Iran-Turkey	5.5	1	2	BOZ(L)
09 May 66	Turkey-Greece	5.5	1	4	CMC(L)
21 Jun 66	Kamchatka-Kuriles	5.8	1	3	CMC(L)
27 Jun 66(11:02)	China-Burma	5.8	1	2	ADL(S)
01 Aug 66	Tadzhik-Hindu Kush	5.8	1	4	SEO(S)
12 Nov 66	Japan	5.8	1	5	BOZ(S)
01 May 67	Turkey-Greece	5.6	5	6	BOZ(S),CMC(S),MAT(S), SEO(S),WES(S)
27 May 67	Tadzhik-Hindu Kush	5.4	1	1	BOZ(L)
21 Jun 67	Alaska	5.4	1	1	MAT(L)
05 Jan 69	Philippines	5.3	1	1	KBL(L)
20 Jan 69	Solomon Is.	5.6	1	1	KBL(L)

TOTALS:

Number of Events: 18

Number of Event-Station Pairs: 22

Number of Events for Which 50% or More of the Observations for a Given Event Satisfy the 0.3 m_h Criterion: 10

original set of small events would seem to be more like large events. Most of these events are the "true" multiple events discussed earlier. Thus for small events, the misclassification rate of the 0.3 m_b increase approach is very small.

If the decision threshold is lowered to 0.2-m_b unit's growth, we now find that 12 instead of 16 large events have 50% or more of the observations for a given station which fail to satisfy this classification criterion (Table XXI); the 12 events represent 32% of the large-event population (42 to 103° distance). In a similar analysis using the small-event codas (Table XXII) 18 events, or 15% of the population are improperly classified using a 0.2 m_b criterion. A few of these events grow due to pP phases, and they are expected to have small-event codas. The misclassification rate is then only about 10%.

The preliminary analysis given above, then, tends to suggest that large-event codas characterize an event which has a standard NOS magnitude $5.8 < m_b < 7.0$ <u>and</u> which has emergent teleseismic P-wave arrivals that display an increase of 0.2 m_b units (or greater) 5 to 30 seconds into the arrival as measured relative to the amplitude in the first 5 seconds of this phase at 50% or more of the stations recordings.

TABLE XXI

Large Events for Which One or More Observations Fail to Satisfy the 0.2 m_b Classification Criterion

DATE	LOCATION	NOS m_b	NUMBER OF OBSERVATIONS WHICH FAIL TO MEET 0.2 m_b CRITERION	NUMBER OF POSSIBLE OBSERVATIONS	STATIONS AT WHICH OBSERVATIONS FAIL TO MEET 0.3 m_b CRITERION
04 Jan 70	China	5.9	1	5	KON(L)
08 Jan 70	Kermadec Is.	6.1	1	3	CHG(L)
20 Jan 70	Tonga Is.-Fiji Is.	6.5	1	3	COL(L)
28 Feb 70	Aleutian Is.	6.1	1	4	COP(S)
27 May 70	Bonin Is.	6.2	1	2	TFO(S)
31 May 70	Peru	6.6	1	3	KON(L)
24 Jun 70	Queen Charlotte Is.	5.6	1	4	SHI(L)
25 Jul 70	Japan	6.1	2	5	COL(L),TFO(L)
30 Aug 70	Sea of Okhotsk	6.6	1	2	TFO(S)
02 Dec 70	Solomon Is.	5.8	2	3	COL(L),TFO(L)
10 Dec 70	Peru	6.6	1	3	COP(L)
02 Aug 71	Japan	6.6	1	2	COP(S)
14 Sep 71	New Britain	6.1	1	3	TFO(S)

TOTALS:

Number of Events: 13

Number of Events-Station Pairs: 15

Number of Events for Which 50% or More of the Observations for a Given Event Fail to Satisfy the 0.2 m_b Classification Criterion (Includes Events from Table XIV): 12

TABLE XXII

Small Events That Satisfy the 0.2 m_b Classification Criterion

DATE	LOCATION	m_b	NUMBER OF OBSERVATIONS WHICH SATISFY 0.2 m_b CRITERION	NUMBER OF POSSIBLE OBSERVATIONS	STATIONS AT WHICH OBSERVATIONS SATISFY 0.2 m_b CRITERION
19 Aug 64(09:33)	Iran-Turkey	5.6	1	2	CHG(S)
14 Aug 65	Solomon Is.	5.5	1	1	MAT(L)
17 Aug 65(10:35)	Sumatra-Java	5.3	1	2	MAT(L)
22 Jan 66	Alaska	5.8	4	7	DAV(L),NDI(S),SEO(S), WES(L)
05 Feb 66	Turkey-Greece	5.8	1	5	CMC(S)
07 Mar 66	Iran-Turkey	5.5	1	2	CMC(L)
19 Mar 66	Kamchatka-Kuriles	5.6	1	1	CHG(S)
09 Apr 66	Central America	5.7	2	3	BOZ(L),CMC(S)
16 Apr 66	Alaska	5.7	1	6	WES(S)
20 Apr 66	Iran-Turkey	5.5	1	2	BOZ(L)
09 May 66	Turkey-Greece	5.5	1	4	CMC(L)
21 Jun 66	Kamchatka-Kuriles	5.8	1	3	CMC(L)
27 Jun 66(11:02)	China-Burma	5.8	1	2	ADE(S)
01 Aug 66	Tadzhik-Hindu Kush	5.8	2	4	MAT(L),SEO(S)
10 Aug 66(05:13)	Tonga Is.-Fiji Is.	5.8	1	4	BOZ(S)
12 Nov 66	Japan	5.8	1	5	BOZ(S)
07 Dec 66	Kamchatka-Kuriles	5.8	1	5	KON(S)
01 May 67	Turkey-Greece	5.6	6	6	BOZ(S),CMC(S),MAT(S), NDI(S),SEO(S),WES(S)
27 May 67	Tadzhik-Hindu Kush	5.4	1	1	BOZ(L)
21 Jun 67	Alaska	5.4	1	1	MAT(L)
10 Dec 67	Calif.-and West. U.S.	5.8	2	2	KON(L),MAL(S)
27 Jun 68(12:10)	Sumatra	5.3	1	1	KBL(L)
07 Nov 68	Aleutian Is.	5.1	1	1	KBL(L)
05 Jan 69	Philippines	5.3	1	1	KBL(L)
20 Jan 69	Solomon Is.	5.6	1	1	KBL(L)

TOTALS:

Number of Events: 25

Number of Event-Station Pairs: 35

Number of Events for Which 50% or More of the Observations for a Given Event Satisfy the 0.2 m_b Criterion: 18

Coda Prediction - Example for an Intermediate Event

To demonstrate the feasibility of predicting earthquake codas using the average coda observations determined in this report, we consider a specific event:

San Fernando Earthquake
9 February 1971
OT $\simeq$ 14:00:41.6 GMT
Latitude: 34.400°N
Longitude: 118.395°W
Depth: 13 km

This event had an m_b (depth corrected) of 6.2, an M_s of 6.5, and a secondary m_b at Berkeley of 6.5. The preliminary classification criterion for intermediate events introduced in the previous section ($5.8 < m_b < 7.0$, and 0.2 m_b growth at 50% or more of the stations reporting) indicates that the small-event coda should be used for this event. That is, the coda at only 6 of the 37 stations at teleseismic distances (FCC, GEO, MBC, RES, KJN, and AQU;(see Figures 7 through 43 in Appendix IV) exhibit increases of 0.2 m_b units or more in the first 30 seconds.

Coda observations for the San Fernando event as determined at 43 stations (Table XXIII) are shown in black in Appendix IV. The appropriate predicted coda-decay curve at each station is shown by the blue line; the dashed blue lines define ± one standard deviation for the individual coda observations. With few exceptions, the coda observations for the San Fernando event lie within one standard deviation of the average coda determinations used for prediction.

TABLE XXIII

Station Information - San Fernando, California, Earthquake

9 February 1971

STATION	LOCATION	LATITUDE	LONGITUDE	ELEVATION (METERS)	DISTANCE (DEGREES)
ALB	Alberni, B.C. Canada	49:16:14N	124:49:18W	25	15.8°
ALE	Alert, N.W. Territory Canada	82:29:00N	62:24:00W	65	51.8°
AQU	Aquila, Italy	42:21:14N	13:24:11E	720	91.6°
ARE	Arequipa, Peru	16:27:44S	71:29:29W	2452	67.5°
BHP	Balboa Heights, Panama	8:57:39N	79:33:29W	36	43.6°
BLC	Baker Lake, N.W. Territory Canada	64:19:00N	96:01:00W	16	33.1°
CAR	Caracas, Venezuela	10:30:24N	66:55:40W	1035	52.5°
CHI	Chicago-Loyola, Illinois	41:54:00N	87:38:00W	183	25.0°
COL	College Outpost, Alaska	64:54:00N	147:47:30W	320	35.4°
COR	Corvallis, Oregon	44:35:09N	123:18:12W	123	11.0°
CUM	Cumana, Venezuela	10:27:54N	64:10:10W	34	54.7°
ESK	Eskdalemuir, Scotland	55:19:00N	3:12:18W	242	74.8°
FAV	Fayetteville, Arkansas	36:07:17N	94:11:26W		19.8°
FBC	Frobisher Bay, N.W. Territory Canada	63:44:00N	68:28:00W	45	42.3°
FCC	Ft. Churchill, Man. Canada	58:45:42N	94:05:12W	39	29.4°
FSJ	Ft. St. James, B.C. Canada	54:26:00N	124:15:00W	772	20.6°
GEO	Georgetown, Washington, D.C.	38:54:00N	77:04:00W	43	33.2°
GHA	Guam, Mariana Islands	13:32:18N	144:54:42E	230	87.8°
INK	Inuvik, N.W. Territory Canada	68:17:30N	133:30:00W	46	35.1°
KEV	Kevo, Finland	69:45:19N	27:00:24E	80	73.0°
KIP	Kipapa, Hawaii	21:25:24N	158:00:54W	70	37.0°
KJN	Kajaani, Finland	64:05:07N	27:42:43E	250	78.1°
KOA	Kobuan, Solomon Islands	6:13:27S	155:37:08E	65	90.2°
KTG	Kap Tobin, Greenland	70:25:00N	21:59:00W	6	60.1°
LHC	Lake Head Univ., Ontario, Canada	48:25:00N	89:16:00W	196	25.8°
LON	Longmire, Washington	46:45:00N	121:48:36W	854	12.8°
MBC	Mould Bay, N.W. Territory Canada	76:14:30N	119:21:30W	15	42.0°
NUR	Nurmijarvi, Finland	60:30:32N	24:39:05E	102	80.6°
PMG	Port Moresby, New Guinea	9:24:33S	147:09:14E	70	98.9°
PTO	Porto, Portugal	41:08:19N	8:36:08W	88	80.8°
RCD	Rapid City, South Dakota	44:04:30N	103:12:30W	995	15.3°
RES	Resolute, Canada	74:41:12N	94:54:00W	15	42.0°
SCH	Schefferville, Ont. Canada	54:49:00N	66:47:00W	540	40.9°
SFA	Seven Falls, Canada	47:07:24N	70:49:35W	232	37.7°
SLM	St. Louis, Missouri	38:38:10N	90:14:10W	161	23.0°
SOD	Sodankyla, Finland	67:22:16N	26:37:45E	181	75.0°
STJ	St. Johns, Canada	47:34:18N	52:44:00W	62	49.8°
SUD	Sudbury, Ont. Canada	46:28:00N	80:58:00W	267	30.7°
TAV	Tavurvur, New Britain Is.	4:13:52S	152:13:13E	31	91.9°
TPM	Tepoztlan, Mexico	18:59:00N	99:03:42W	150	23.0°
VAL	Valentia, Ireland	51:56:22N	10:14:39W	14	73.5°
VIC	Victoria, B.C. Canada	48:31:10N	123:24:55W	197	14.8°
YKC	Yellow Knife, Canada	62:28:42N	114:28:42W	198	28.4°

CONCLUSIONS

From an analysis of 418 small-event ($m_b \leq 5.8$) seismograms recorded at 17 world-wide stations, and of 148 large-event (m_b, M_s or secondary $m_b \geq 7.0$) seismograms recorded at 8 world-wide stations and TFO, the following conclusions are drawn with respect to the coda-decay characteristics for these events:

1. Coda shape is approximately a function of the arrival times and relative amplitudes of significant secondary arrivals for both large and small events. However, the greater the event magnitude, the higher is the relative amplitude level for elapsed times greater than about 20 seconds into the coda. For the data examined, and at the 95% confidence level (one-sided t-test), the mean difference is 0.14 m_b units.

2. The explanation for the observed increase in coda level with magnitude appears to be that large events are, in fact, multiple events, with the nominal period of source activity for a given sequence being on the order of 1 or 2 minutes. As such, the later events in a sequence retard the coda decay, and elevate the relative amplitude in the coda above that expected for a single event.

3. The emergent character of the P-wave arrival for large events tends to yield an m_b estimate which is roughly 0.3 m_b units lower than what might be considered a more representative value. Because large-event magnitudes are underestimated, so too

must the number of large events which occur be underestimated.

4. Because of relative coda level at a given time after arrival onset is a function of magnitude, large-event and small-event codas can not be combined to produce a single comprehensive set of average coda predictions. Rather, at least two sets of coda determinations are required (and given in this report), one each for what will be defined below as "large" and "small" events.

5. The small-event codas adequately characterize events with an $m_b \leq 5.8$. The large-event codas adequately characterize events for which m_b or $M_s \geq 7.0$. Preliminary results suggest that for intermediate events ($5.8 < m_b < 7.0$), the large-event codas are reliable if the codas at 50% or more of the stations recording display an increase of 0.2 m_b units (or greater) 5 to 30 seconds into the P-wave arrival as measured relative to the amplitude in the first 5 seconds of this phase. As with small events, coda growth due to pP is a major problem with intermediate events.

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ACKNOWLEDGEMENTS

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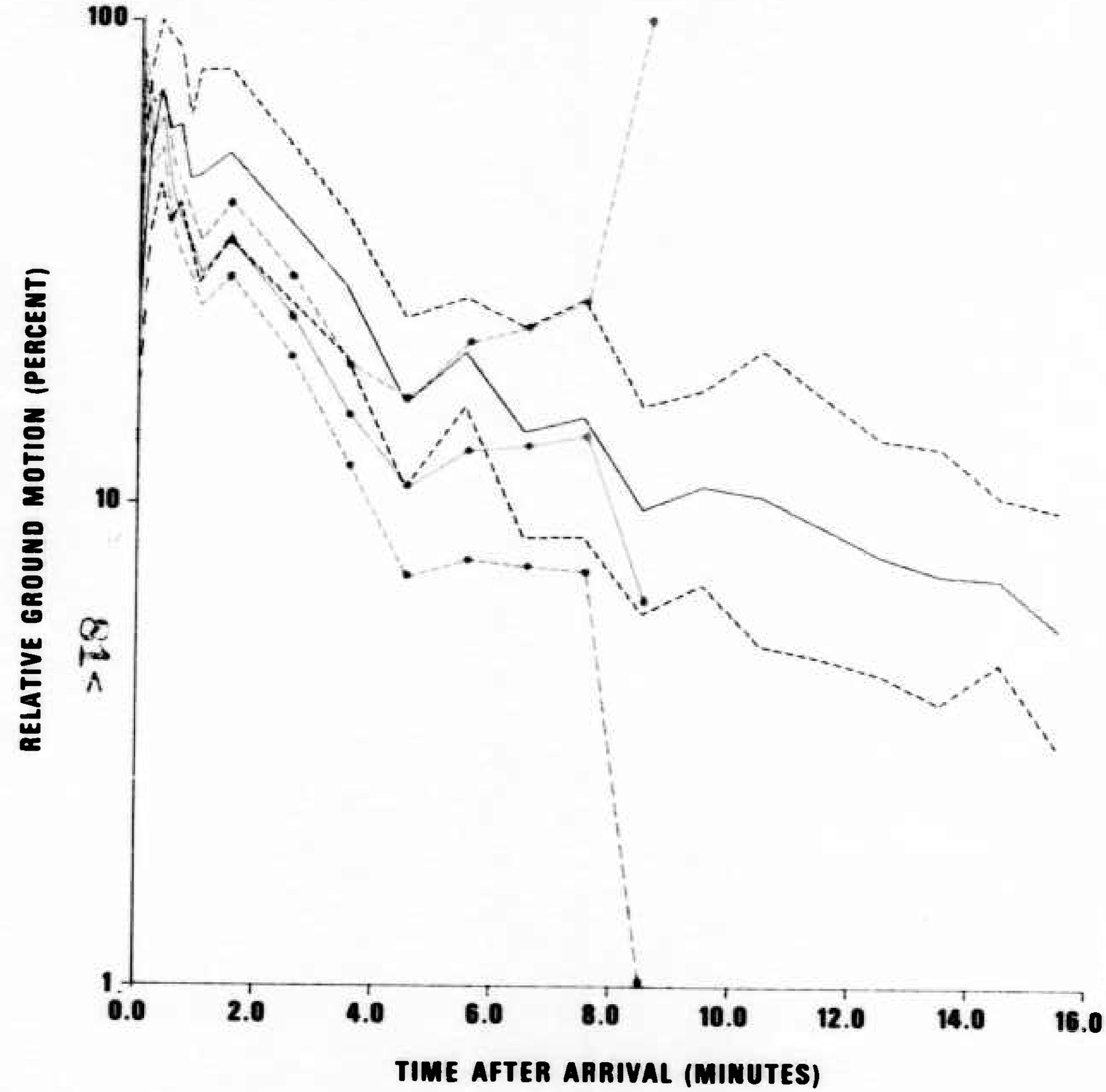
APPENDIX I

Comparison of large-event and small-event coda averages; large-event coda average shown in black, lower table; small-event coda average shown in blue, top table; dashed and dashed lines with dots, respectively, indicate 95% confidence level for the coda averages.

1. 42-53°
2. 53-56°
3. 56-59°
4. 59-63°
5. 63-67°
6. 67-72°
7. 72-79°
8. 79-84°
9. 84-98°
10. 98-103°
11. 110-115°
12. 118-127°
13. 127-136°
14. 136-140°
15. 140-145°
16. 145-155°
17. 155-166°



TIME	AVG	STD DEV	OBS
0.0 S	78.	0.02	44.
10.0 S	57.	0.03	44.
20.0 S	62.	0.03	44.
30.0 S	44.	0.03	44.
40.0 S	39.	0.03	44.
50.0 S	34.	0.03	44.
1.0 M	30.	0.03	44.
1.5 M	35.	0.04	44.
2.5 M	25.	0.04	38.
3.5 M	16.	0.05	31.
4.5 M	11.	0.09	15.
5.5 M	13.	0.10	10.
6.5 M	14.	0.10	8.
7.5 M	14.	0.10	5.
8.5 M	7.	0.32	2.

TIME	AVG	STD DEV	OBS
0.0 S	28.	0.08	9.
10.0 S	55.	0.07	5.
20.0 S	72.	0.07	9.
30.0 S	60.	0.08	9.
40.0 S	61.	0.07	9.
50.0 S	47.	0.06	9.
1.0 M	48.	0.09	9.
1.5 M	53.	0.08	9.
2.5 M	39.	0.07	9.
3.5 M	29.	0.06	9.
4.5 M	17.	0.08	9.
5.5 M	21.	0.05	8.
6.5 M	15.	0.09	8.
7.5 M	16.	0.11	8.
8.5 M	10.	0.09	8.
9.5 M	11.	0.09	8.
10.5 M	11.	0.13	8.
11.5 M	10.	0.11	8.
12.5 M	8.	0.10	8.
13.5 M	8.	0.11	8.
14.5 M	8.	0.07	8.
15.5 M	6.	0.10	8.

Figure AI-1. Comparison of large-event and small-event coda averages, 42-53°.

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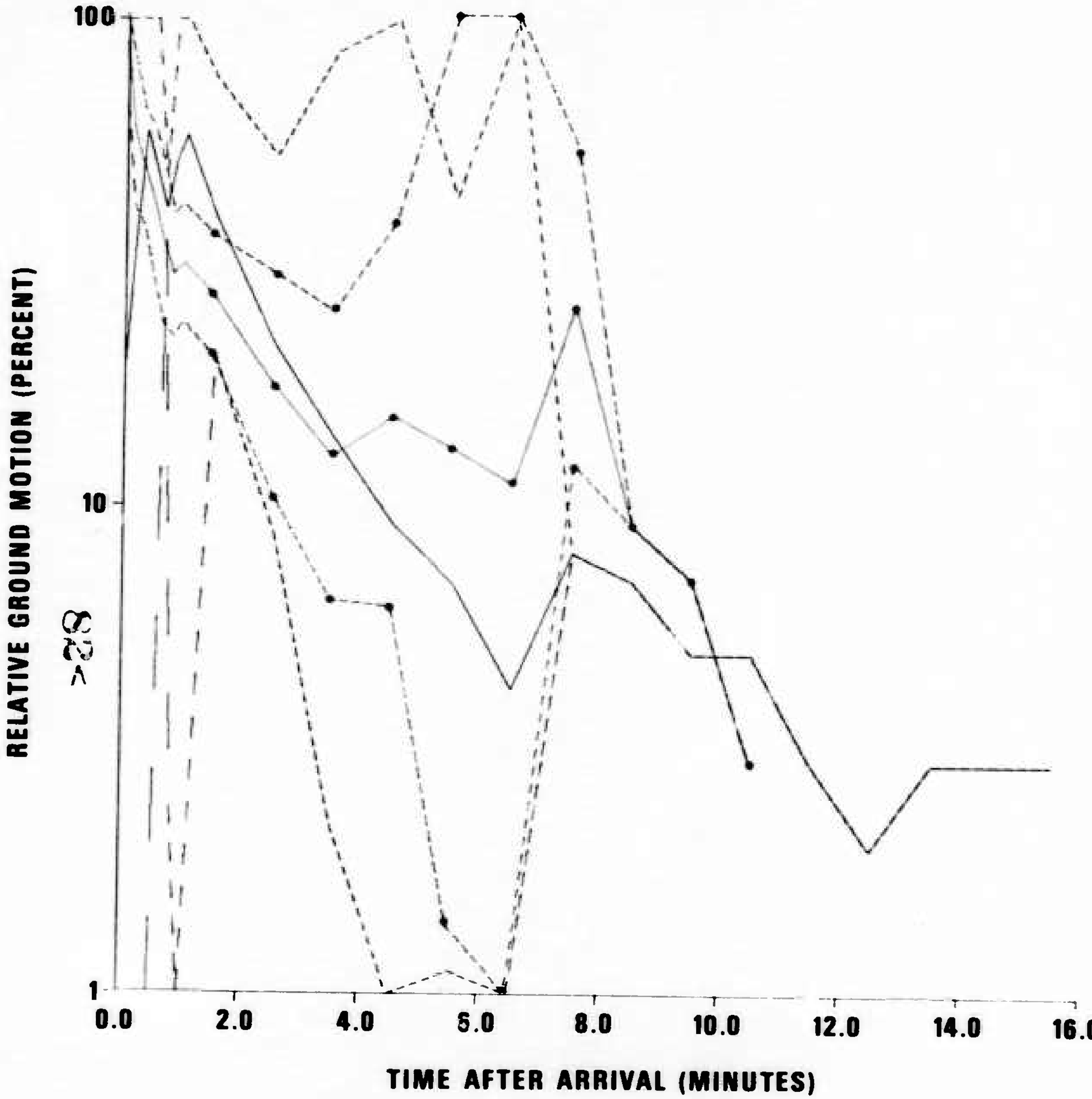
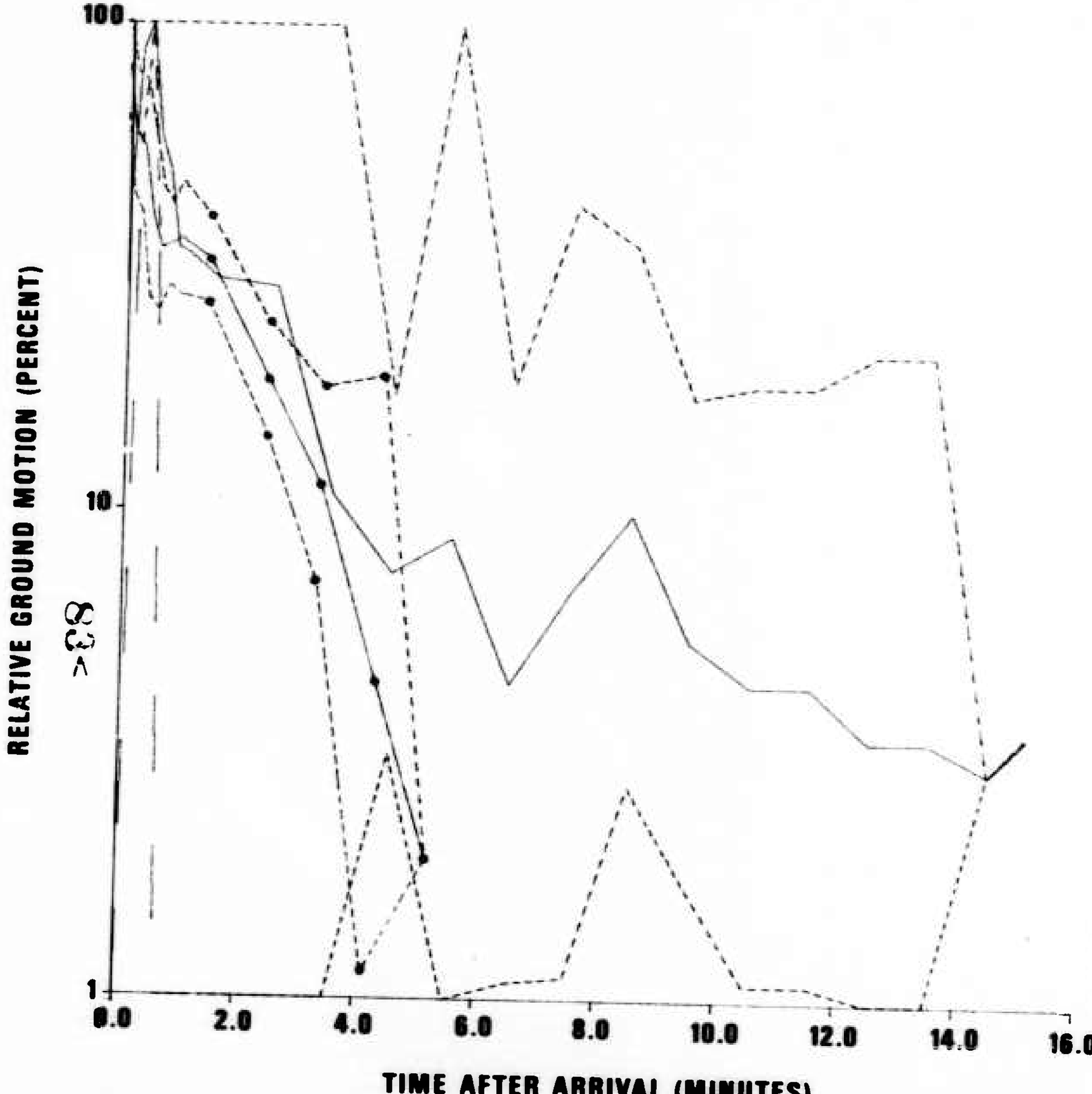


TIME		AVG	STD DEV	OBS
0.0	S	90.	0.03	11.
10.0	S	57.	0.07	11.
20.0	S	48.	0.05	11.
30.0	S	41.	0.07	11.
40.0	S	34.	0.07	11.
50.0	S	30.	0.06	11.
1.0	M	31.	0.05	11.
1.5	M	27.	0.05	11.
2.5	M	18.	0.10	8.
3.5	M	13.	0.12	7.
4.5	M	16.	0.12	4.
5.5	M	13.	0.22	3.
6.5	M	11.	0.44	2.
7.5	M	26.	0.03	2.
8.5	M	9.	0.0	1.
9.5	M	7.	0.0	1.
10.5	M	3.	0.0	1.

TIME		AVG	STD DEV	OBS
0.0	S	20.	0.51	2.
10.0	S	35.	0.46	2.
20.0	S	59.	0.15	2.
30.0	S	50.	0.1[illegible]	2.
40.0	S	41.	0.01	2.
50.0	S	51.	0.06	2.
1.0	M	58.	0.24	2.
1.5	M	39.	0.02	2.
2.5	M	22.	0.03	2.
3.5	M	14.	0.06	2.
4.5	M	10.	0.12	2.
5.5	M	7.	0.06	2.
6.5	M	5.	0.15	2.
7.5	M	8.	0.0	1.
8.5	M	7.	0.0	1.
9.5	M	5.	0.0	1.
10.5	M	5.	0.0	1.
11.5	M	3.	0.0	1.
12.5	M	3.	0.0	1.
13.5	M	3.	0.0	1.
14.5	M	3.	0.0	1.
15.5	M	3.	0.0	1.

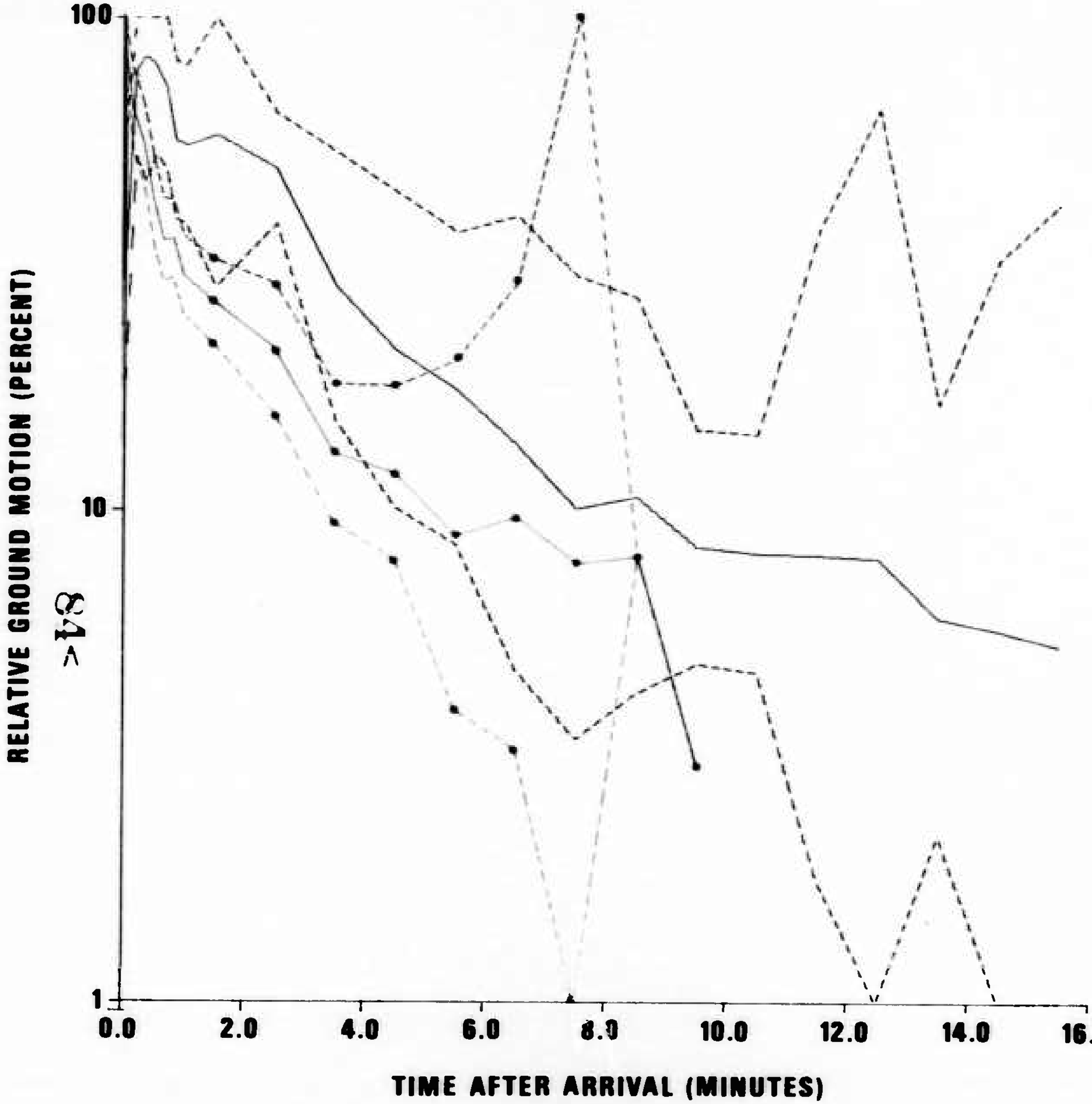
Figure A1-2. Comparison of large-event and small-event coda averages, 53-56°.



TIME	AVG	STD DEV	OBS
0.0 S	97.	[illegible]	11.
10.0 S	60.	0.05	11.
20.0 S	56.	0.06	11.
30.0 S	41.	0.04	11.
40.0 S	35.	0.06	11.
50.0 S	36.	0.04	11.
1.0 M	27.	0.05	11.
1.5 M	24.	0.04	11.
2.5 M	20.	0.05	11.
3.5 M	17.	[illegible]	7.
4.5 M	5.	0.14	3.
5.5 M	3.	[illegible]	1.

TIME	AVG	STD DEV	OBS
0.0 S	44.	0.19	2.
10.0 S	88.	0.01	2.
20.0 S	100.	0.0	2.
30.0 S	59.	0.02	2.
40.0 S	50.	0.12	2.
50.0 S	35.	0.11	2.
1.0 M	34.	0.10	2.
1.5 M	30.	0.11	2.
2.5 M	29.	0.26	2.
3.5 M	11.	0.08	2.
4.5 M	8.	0.03	2.
5.5 M	9.	0.17	2.
6.5 M	5.	0.05	2.
7.5 M	7.	0.06	2.
8.5 M	10.	0.04	2.
9.5 M	6.	0.04	2.
10.5 M	5.	0.05	2.
11.5 M	5.	0.05	2.
12.5 M	4.	0.06	2.
13.5 M	4.	0.06	2.
14.5 M	3.	0.0	2.
15.5 M	4.	0.00	2.

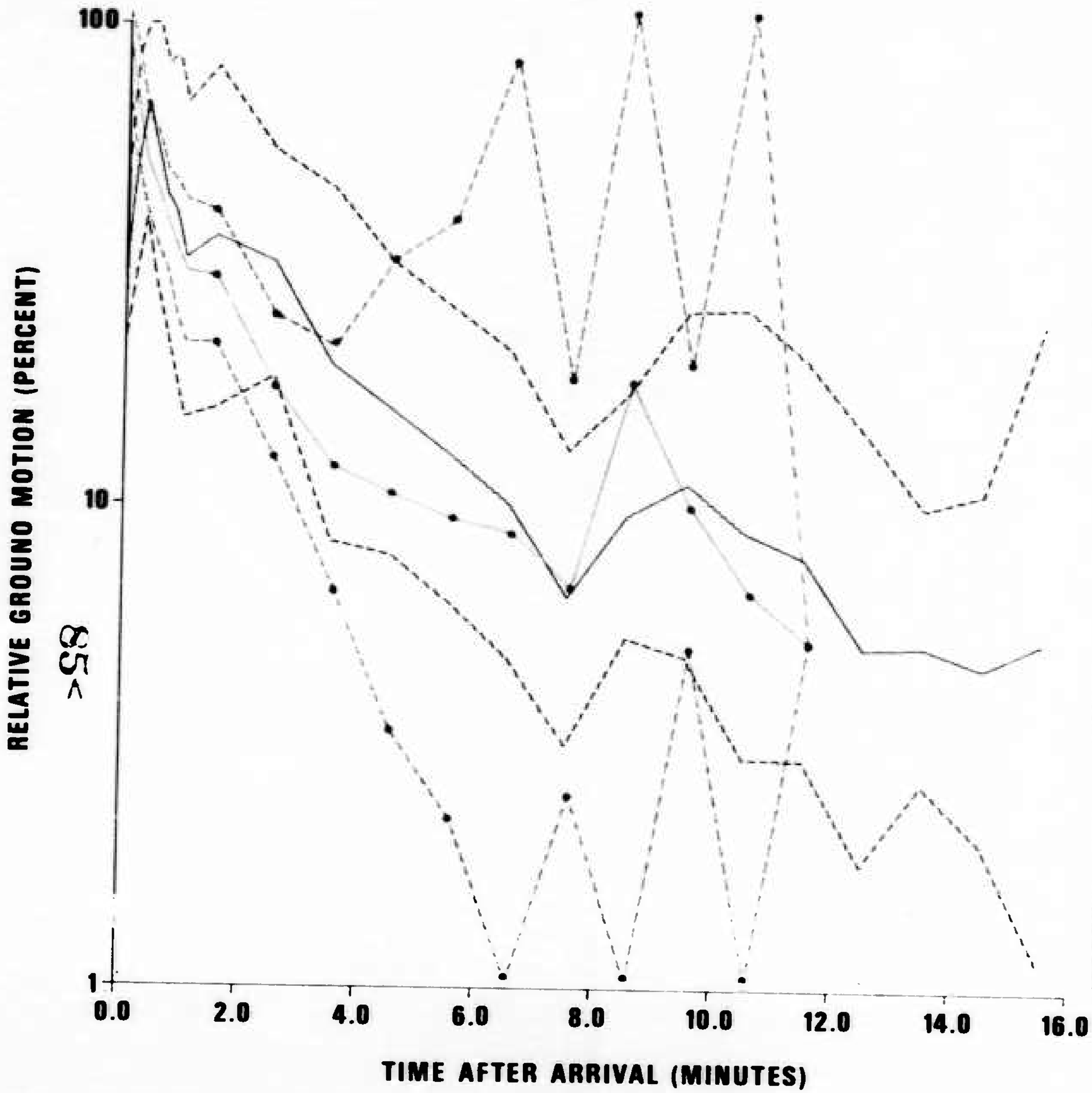
Figure AI-3. Comparison of large-event and small-event coda averages, 56-59°.



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.02	25.
10.0 S	63.	0.04	25.
20.0 S	55.	0.04	25.
30.0 S	42.	0.04	25.
40.0 S	35.	0.04	25.
50.0 S	35.	0.04	25.
1.0 M	30.	0.04	25.
1.5 M	27.	0.04	25.
2.5 M	22.	0.06	20.
3.5 M	13.	0.07	17.
4.5 M	12.	0.09	11.
5.5 M	9.	0.14	6.
6.5 M	10.	0.15	4.
7.5 M	8.	0.29	2.
8.5 M	8.	0.0	1.
9.5 M	3.	0.0	1.

TIME	AVG	STD DEV	OBS
0.0 S	33.	0.08	4.
10.0 S	79.	0.04	4.
20.0 S	84.	0.05	4.
30.0 S	80.	0.04	4.
40.0 S	73.	0.05	4.
50.0 S	57.	0.05	4.
1.0 M	55.	0.05	4.
1.5 M	58.	0.09	4.
2.5 M	50.	0.04	4.
3.5 M	29.	0.09	4.
4.5 M	22.	0.10	4.
5.5 M	18.	0.10	4.
6.5 M	14.	0.15	4.
7.5 M	11.	0.15	4.
8.5 M	11.	0.13	4.
9.5 M	[illegible]	0.08	4.
10.5 M	9.	0.08	4.
11.5 M	9.	0.15	3.
12.5 M	8.	0.21	3.
13.5 M	6.	0.10	3.
14.5 M	6.	0.18	3.
15.5 M	6.	0.21	3.

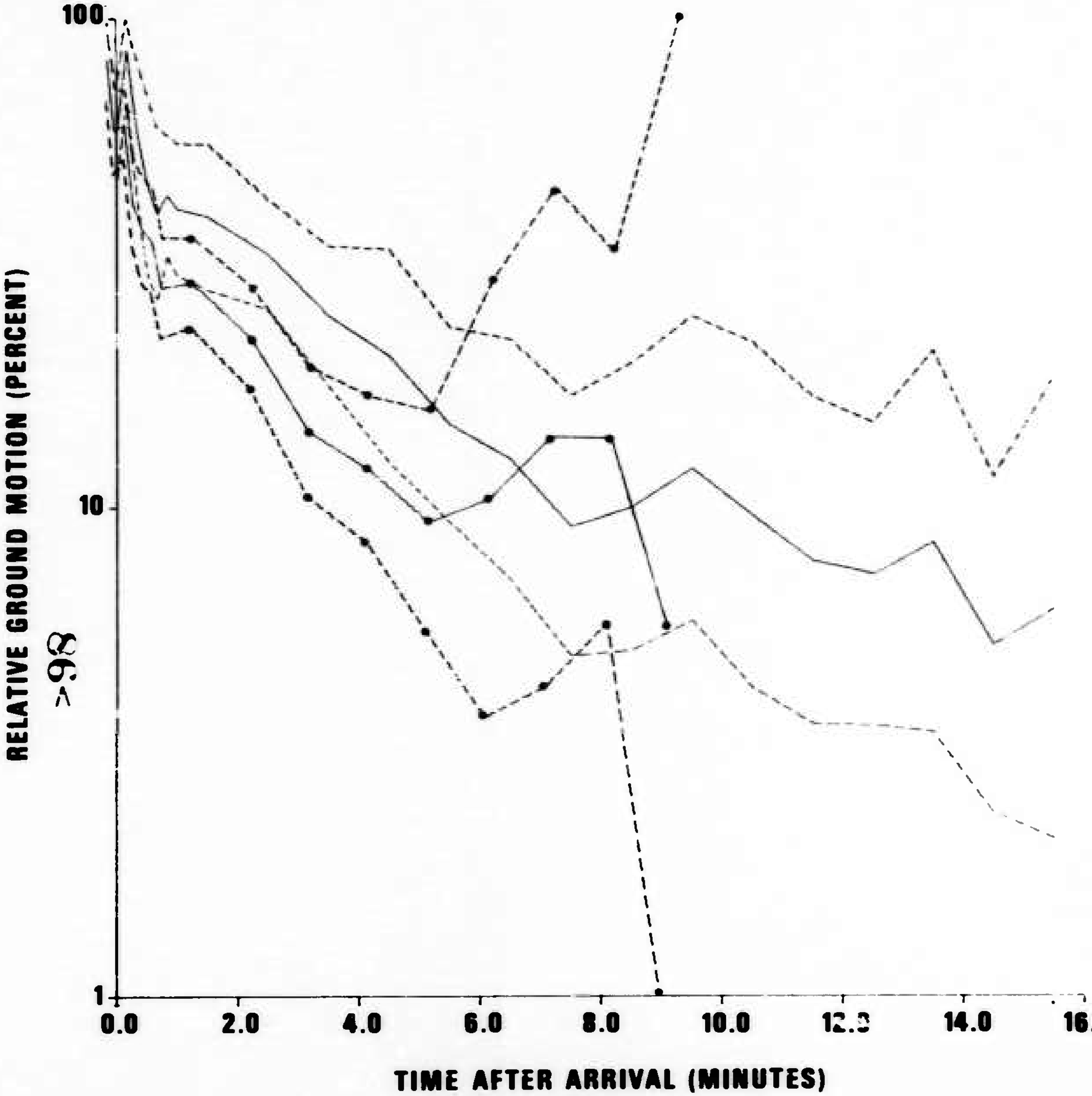
Figure AI-4. Comparison of large-event and small-event coda averages, 59-63°.



TIME		AVG	STD DEV	OBS
0.0	S	89.	0.04	14.
10.0	S	63.	0.06	14.
20.0	S	49.	0.05	14.
30.0	S	43.	0.05	14.
40.0	S	37.	0.05	14.
50.0	S	33.	0.06	14.
1.0	M	29.	0.07	14.
1.5	M	29.	0.06	14.
2.5	M	17.	0.07	11.
3.5	M	12.	0.10	7.
4.5	M	11.	0.11	3.
5.5	M	9.	0.05	2
6.5	M	9.	0.08	2.
7.5	M	7.	0.03	2.
8.5	M	18.	0.09	2.
9.5	M	10.	0.02	2.
10.5	M	7.	0.10	2.
11.5	M	5.	0.0	1.

TIME		AVG	STD DEV	OBS
0.0	S	32.	0.06	6.
10.0	S	51.	0.09	6.
20.0	S	69.	0.08	6.
30.0	S	55.	0.11	6.
40.0	S	44.	0.11	6.
50.0	S	41.	0.13	6.
1.0	M	33.	0.13	6.
1.5	M	36.	0.14	6.
2.5	M	32.	0.09	6.
3.5	M	20.	0.14	6.
4.5	M	16.	0.12	6.
5.5	M	13.	0.12	6.
6.5	M	11.	0.12	6.
7.5	M	7.	0.11	5.
8.5	M	10.	0.09	5.
9.5	M	12.	0.13	5.
10.5	M	9.	0.17	5.
11.5	M	8.	0.15	5.
12.5	M	6.	0.14	4.
13.5	M	6.	0.09	4.
14.5	M	5.	0.11	4.
15.5	M	6.	0.21	4.

Figure AI-5. Comparison of large-event and small-event coda averages, 63-67°.



TIME		AVG	STD DEV	OBS
0.0	S	83.	0.03	21.
10.0	S	64.	0.04	21.
20.0	S	59.	0.03	21.
30.0	S	40.	0.04	21.
40.0	S	35.	0.05	21.
50.0	S	33.	0.05	21.
1.0	M	27.	0.05	21.
1.5	M	28.	0.04	21.
2.5	M	22.	[illegible]	20.
3.5	M	14.	0.04	17.
4.5	M	12.	0.07	12.
5.5	M	10.	0.10	5.
6.5	M	11.	0.16	5.
7.5	M	14.	0.14	4.
8.5	M	14.	0.12	4.
9.5	M	6.	0.15	2.

TIME		AVG	STD DEV	OBS
0.0	S	59.	0.05	11.
10.0	S	87.	0.04	11.
20.0	S	60.	0.06	11.
30.0	S	46.	0.09	11.
40.0	S	40.	0.08	11.
50.0	S	44.	0.06	11.
1.0	M	41.	0.06	11.
1.5	M	40.	0.07	11.
2.5	M	33.	0.05	11.
3.5	M	25.	0.06	11.
4.5	M	21.	0.05	9.
5.5	M	15.	0.09	9.
6.5	M	13.	0.10	8.
7.5	M	10.	0.11	7.
8.5	M	10.	0.11	6.
9.5	M	12.	0.12	6.
10.5	M	10.	0.14	6.
11.5	M	8.	0.13	6.
12.5	M	8.	0.12	6.
13.5	M	9.	0.14	5.
14.5	M	6.	0.12	5.
15.5	M	7.	0.17	5.

Figure AI-6. Comparison of large-event and small-event coda averages, 67-72°.

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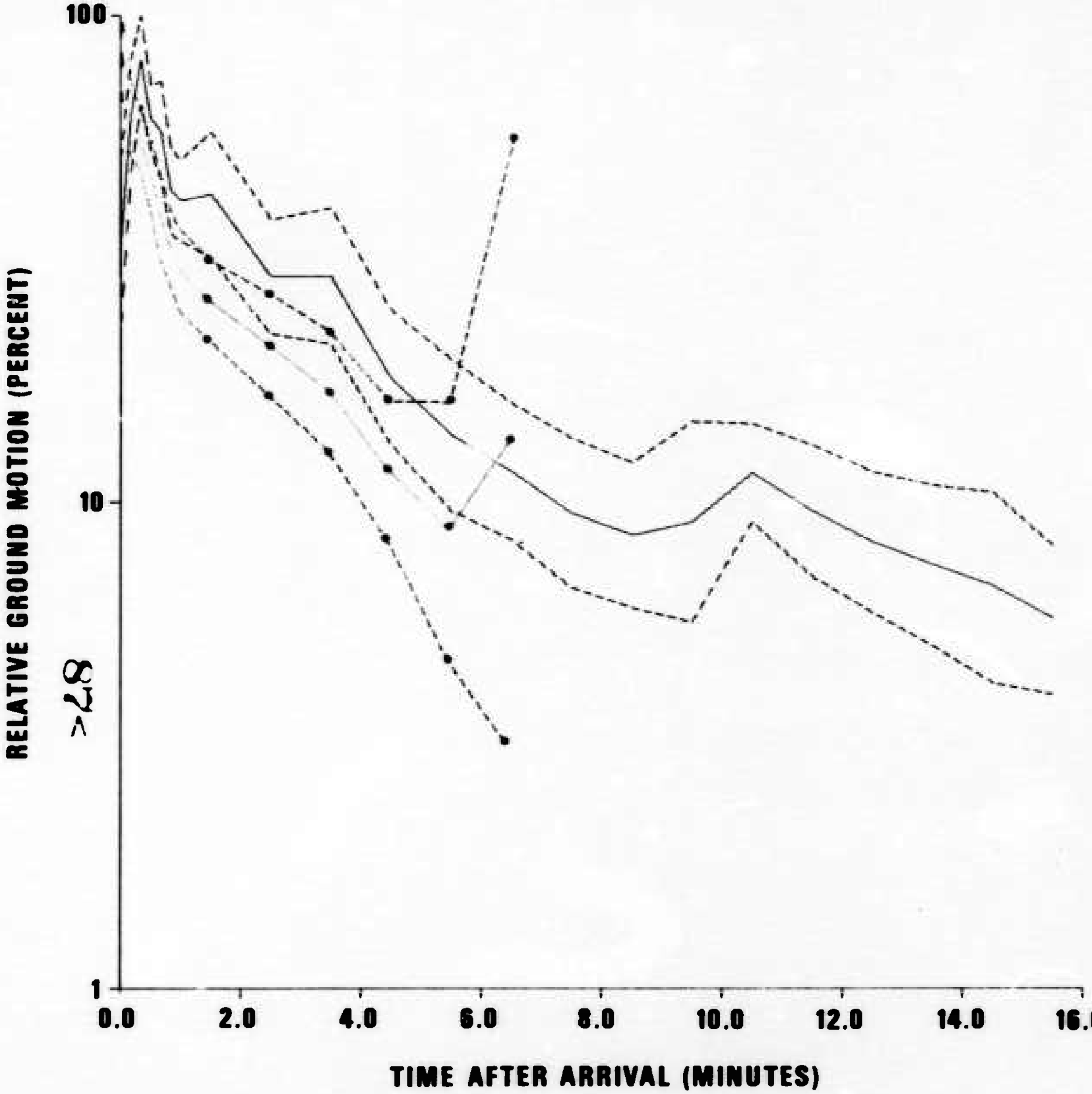
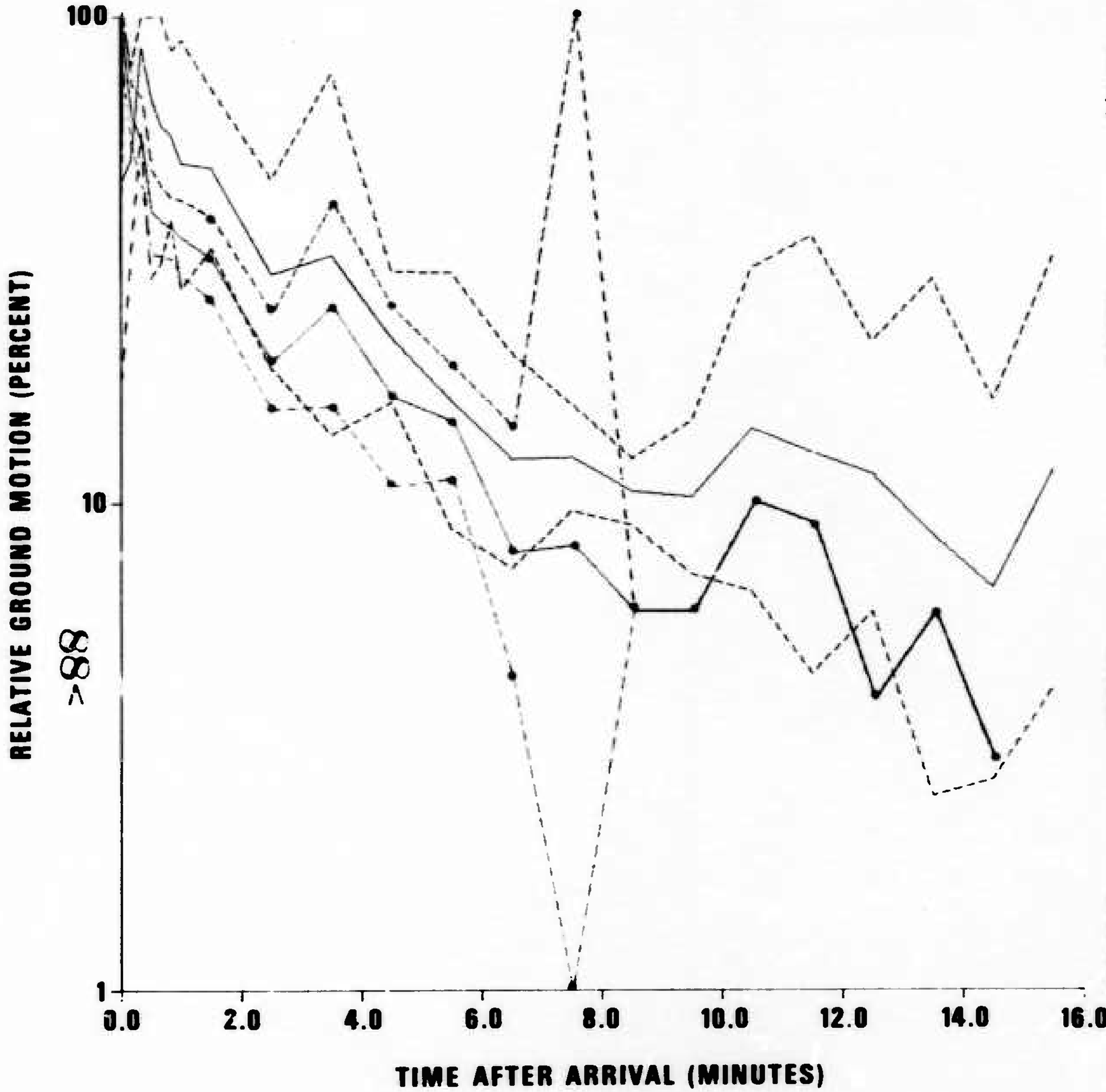


TIME	AVG	STD DEV	OBS
0.0 S	98.	0.03	33.
10.0 S	67.	0.04	33.
20.0 S	57.	0.03	33.
30.0 S	48.	0.04	33.
40.0 S	40.	0.04	33.
50.0 S	35.	0.04	33.
1.0 M	31.	0.04	33.
1.5 M	27.	0.04	33.
2.5 M	22.	0.05	23.
3.5 M	18.	0.06	20.
4.5 M	13.	0.07	14.
5.5 M	10.	0.11	8.
6.5 M	15.	0.14	3.

TIME	AVG	STD DEV	OBS
0.0 S	35.	0.08	13.
10.0 S	63.	0.05	13.
20.0 S	82.	0.04	13.
30.0 S	62.	0.03	13.
40.0 S	58.	0.05	13.
50.0 S	44.	0.04	13.
1.0 M	42.	0.04	13.
1.5 M	43.	0.06	13.
2.5 M	30.	0.05	13.
3.5 M	30.	0.06	13.
4.5 M	19.	0.06	13.
5.5 M	14.	0.07	13.
6.5 M	12.	0.06	11.
7.5 M	10.	0.07	10.
8.5 M	9.	0.07	10.
9.5 M	10.	0.09	10.
10.5 M	12.	0.04	10.
11.5 M	10.	0.06	10.
12.5 M	9.	0.06	10.
13.5 M	8.	0.07	10.
14.5 M	7.	0.08	9.
15.5 M	6.	0.06	9.

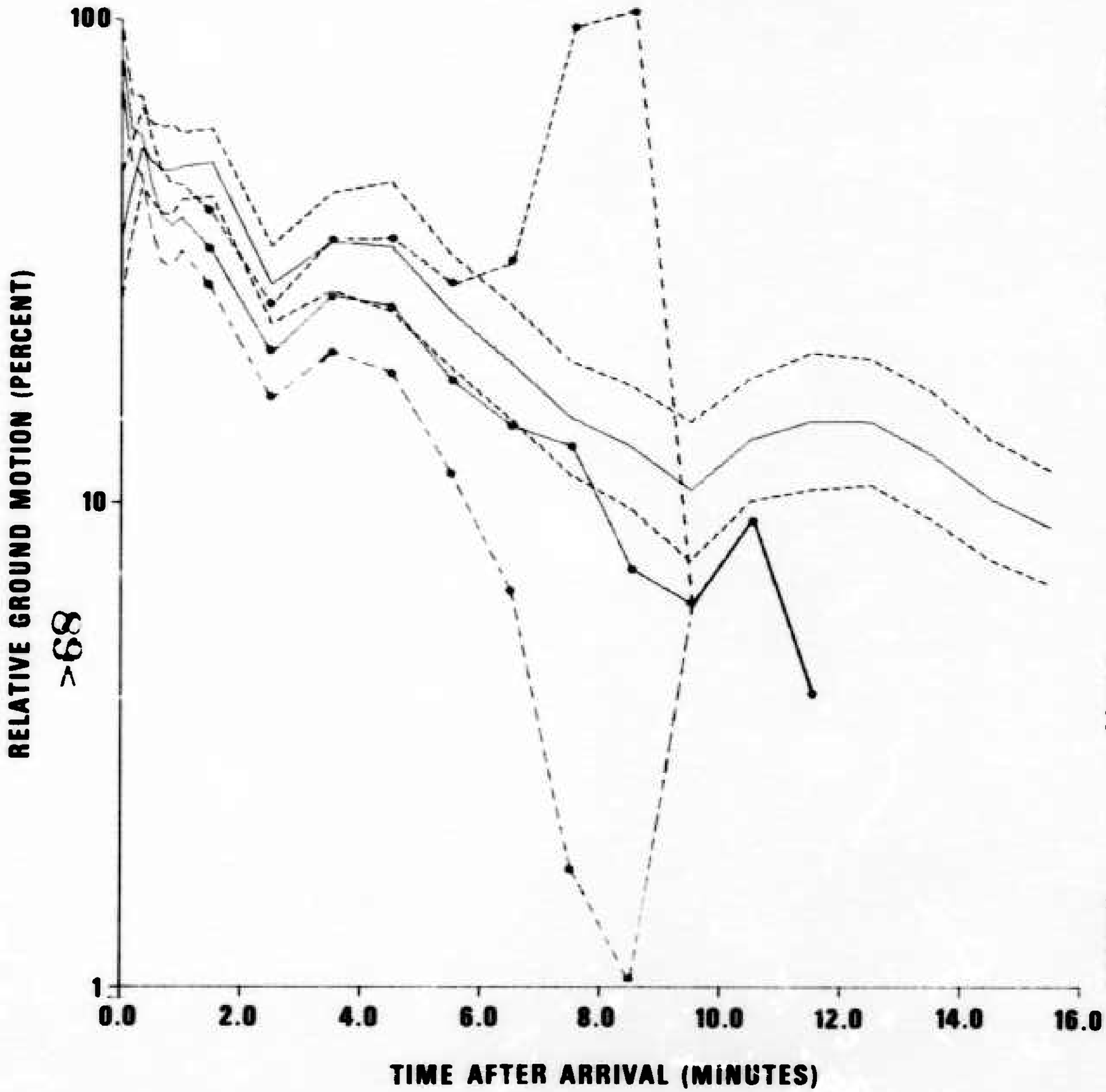
Figure AI-7. Comparison of large-event and small-event coda averages, 72-79°.



TIME		AVG	STD DEV	OBS
0.0	S	50.	0.03	22.
10.0	S	61.	0.03	22.
20.0	S	55.	0.04	22.
30.0	S	39.	0.04	22.
40.0	S	38.	0.03	22.
50.0	S	36.	0.03	22.
1.0	M	35.	0.04	22.
1.5	M	32.	0.04	22.
2.5	M	20.	0.05	18.
3.5	M	26.	0.09	11.
4.5	M	17.	0.08	10.
5.5	M	15.	0.05	8.
6.5	M	8.	0.06	3.
7.5	M	9.	0.13	2.
8.5	M	6.	0.0	1.
9.5	M	6.	0.0	1.
10.5	M	10.	0.0	1.
11.5	M	9.	0.0	1.
12.5	M	4.	0.0	1.
13.5	M	6.	0.0	1.
14.5	M	3.	0.0	1.

TIME		AVG	STD DEV	OBS
0.0	S	46.	0.14	5.
10.0	S	51.	0.07	5.
20.0	S	87.	0.04	5.
30.0	S	69.	0.10	5.
40.0	S	60.	0.09	5.
50.0	S	58.	0.06	5.
1.0	M	50.	0.09	5.
1.5	M	49.	0.06	5.
2.5	M	30.	0.07	5.
3.5	M	33.	0.13	5.
4.5	M	23.	0.05	5.
5.5	M	17.	0.10	5.
6.5	M	13.	0.08	5.
7.5	M	13.	0.04	5.
8.5	M	11.	0.02	5.
9.5	M	11.	0.04	3.
10.5	M	15.	0.08	3.
11.5	M	13.	0.10	3.
12.5	M	12.	0.06	3.
13.5	M	9.	0.12	3.
14.5	M	7.	0.09	3.
15.5	M	12.	0.10	3.

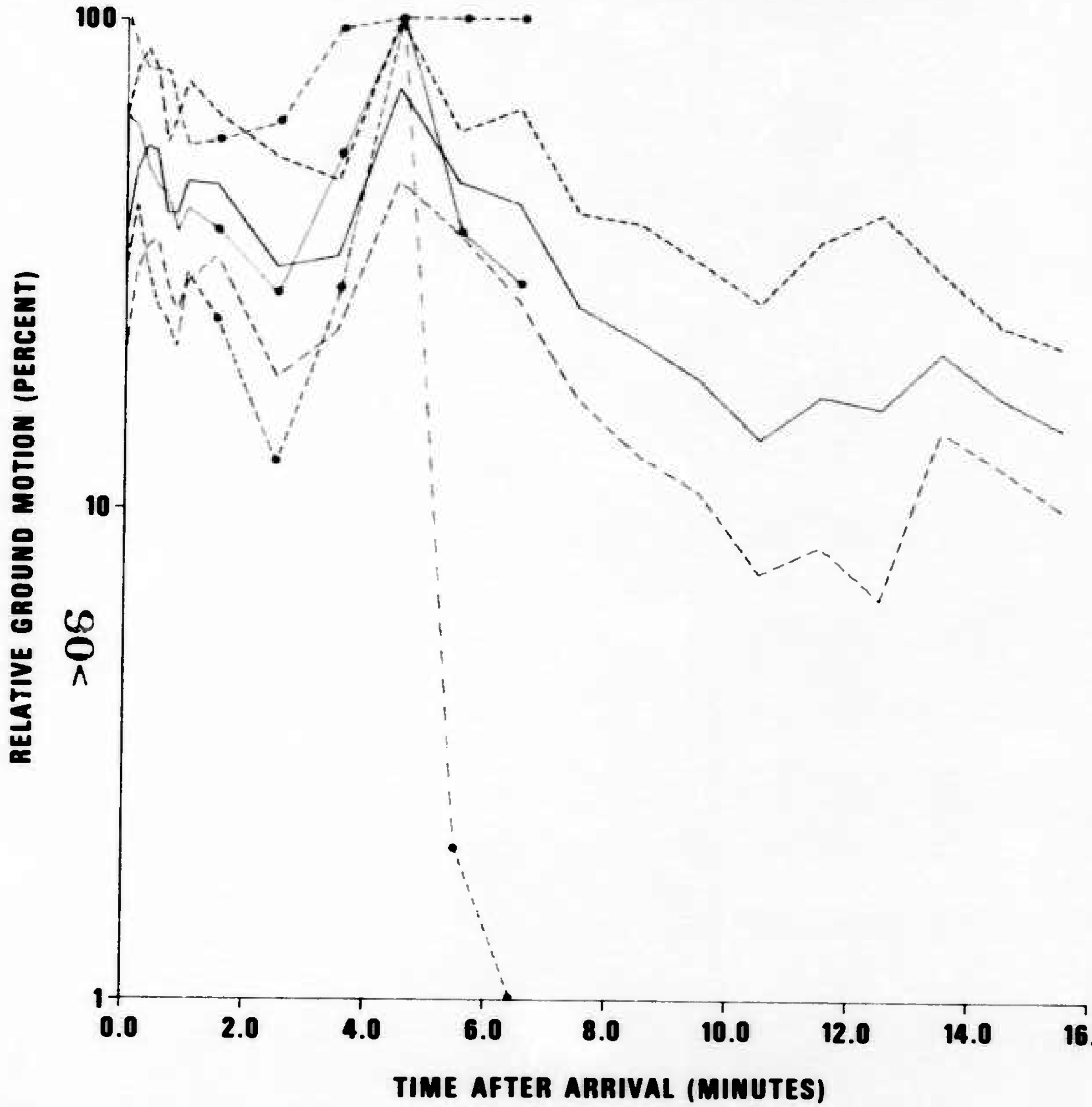
Figure AI-8. Comparison of large-event and small-event coda averages, 79-84°.



TIME	AVG	STD DEV	OBS
0.0 S	79.	0.03	32.
10.0 S	57.	0.03	32.
20.0 S	55.	0.04	32.
30.0 S	44.	0.04	32.
40.0 S	38.	0.04	32.
50.0 S	36.	0.04	32.
1.0 M	38.	0.03	32.
1.5 M	32.	0.04	32.
2.5 M	20.	0.05	28.
3.5 M	26.	0.06	22.
4.5 M	25.	0.07	15.
5.5 M	18.	0.09	13.
6.5 M	14.	0.14	7.
7.5 M	13.	0.20	3.
8.5 M	9.	0.15	2.
9.5 M	6.	0.0	1.
10.5 M	5.	0.0	1.
11.5 M	4.	0.0	1.

TIME	AVG	STD DEV	OBS
0.0 S	36.	0.06	33.
10.0 S	45.	0.05	33.
20.0 S	55.	0.04	33.
30.0 S	51.	0.04	33.
40.0 S	49.	0.04	33.
50.0 S	49.	0.05	33.
1.0 M	50.	0.03	33.
1.5 M	51.	0.03	33.
2.5 M	29.	0.04	33.
3.5 M	35.	0.05	33.
4.5 M	35.	0.06	32.
5.5 M	26.	0.06	32.
6.5 M	20.	0.06	32.
7.5 M	16.	0.06	31.
8.5 M	14.	0.06	31.
9.5 M	11.	0.07	27.
10.5 M	14.	0.06	27.
11.5 M	15.	0.07	26.
12.5 M	15.	0.06	26.
13.5 M	13.	0.07	26.
14.5 M	11.	0.06	24.
15.5 M	9.	0.06	24.

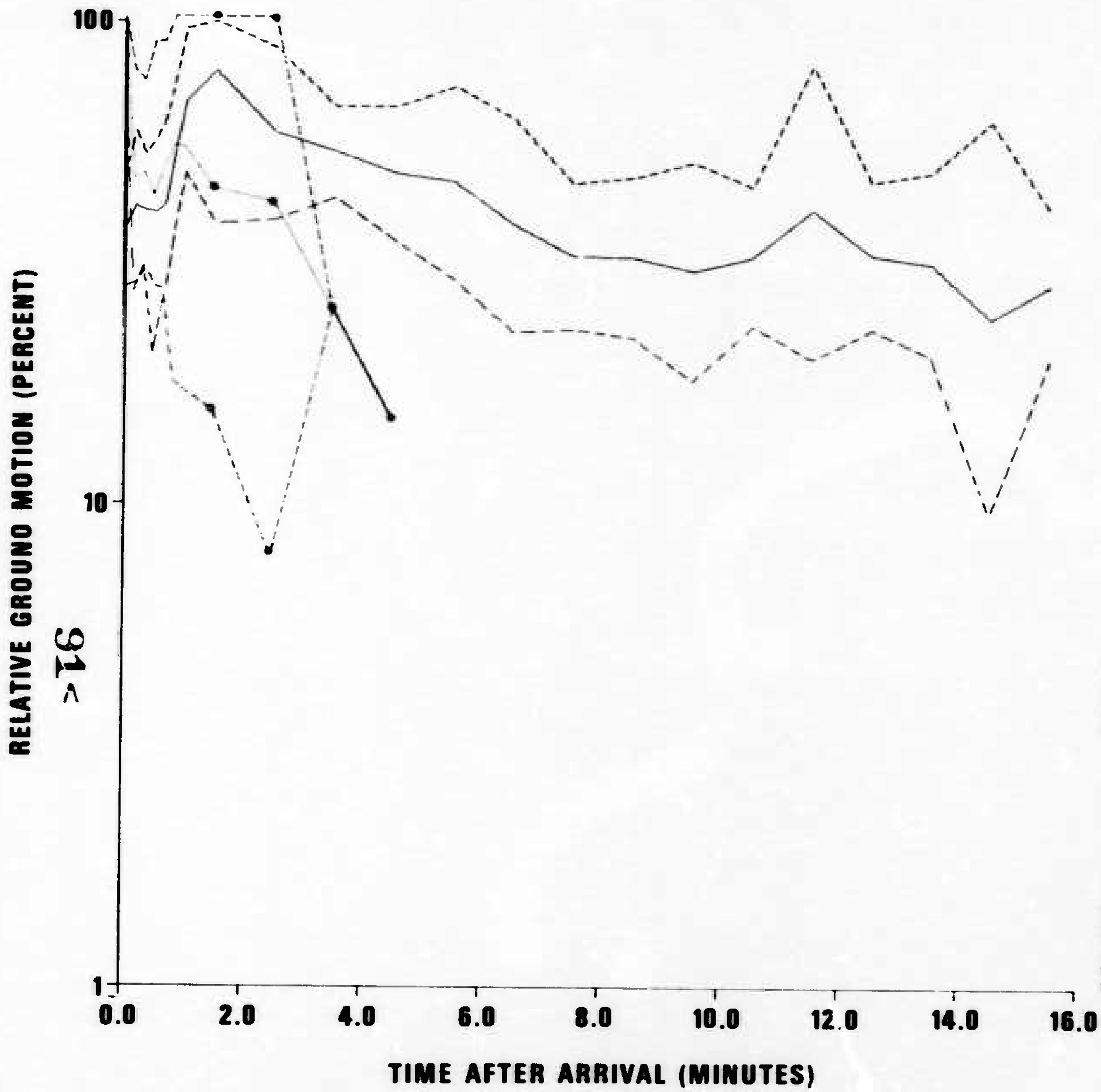
Figure AI-9. Comparison of large-event and small-event coda averages, 84-98°.



TIME	AVG	STD DEV	OBS
0.0 S	62.	0.10	6.
10.0 S	55.	0.06	6.
20.0 S	50.	0.06	6.
30.0 S	45.	0.09	6.
40.0 S	44.	0.10	6.
50.0 S	37.	0.09	6.
1.0 M	41.	0.05	6.
1.5 M	37.	0.07	6.
2.5 M	28.	0.11	4.
3.5 M	51.	0.08	4.
4.5 M	100.	0.0	3.
5.5 M	37.	0.19	3.
6.5 M	29.	0.24	3.

TIME	AVG	STD DEV	OBS
0.0 S	37.	0.10	8.
10.0 S	49.	0.09	8.
20.0 S	55.	0.09	8.
30.0 S	54.	0.07	8.
40.0 S	41.	0.06	8.
50.0 S	40.	0.08	8.
1.0 M	47.	0.09	8.
1.5 M	46.	0.06	8.
2.5 M	32.	0.09	8.
3.5 M	34.	0.06	8.
4.5 M	72.	0.07	7.
5.5 M	47.	0.04	7.
6.5 M	42.	0.08	7.
7.5 M	27.	0.08	7.
8.5 M	23.	0.10	7.
9.5 M	19.	0.10	7.
10.5 M	15.	0.11	7.
11.5 M	18.	0.13	7.
12.5 M	17.	0.15	6.
13.5 M	22.	0.06	6.
14.5 M	18.	0.06	6.
15.5 M	15.	0.07	6.

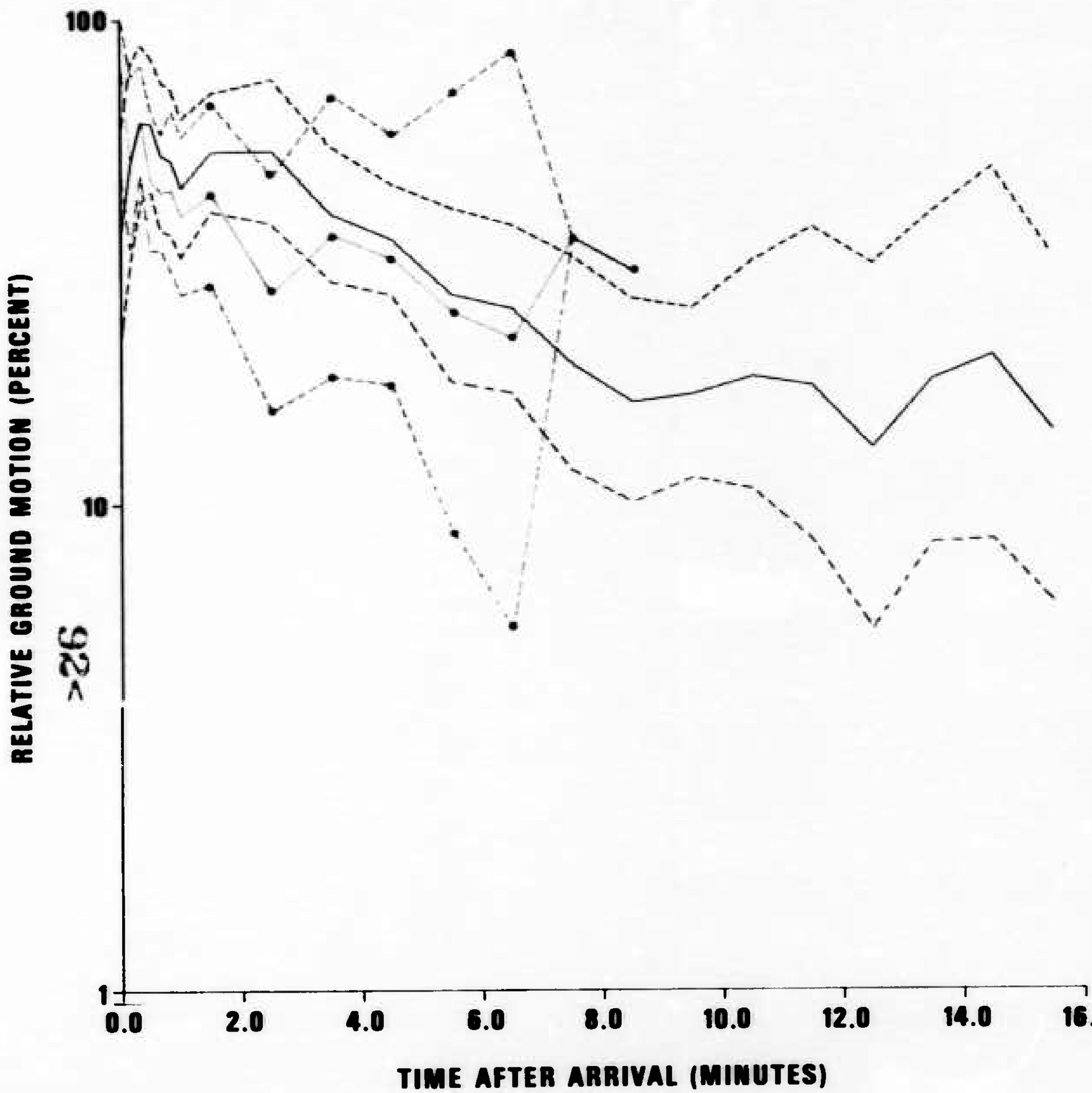
Figure AI-10. Comparison of large-event and small-event coda averages, 98-103°.



TIME		AVG	STD DEV	OBS
0.0	S	55.	0.02	4.
10.0	S	46.	0.07	4.
20.0	S	48.	0.06	4.
30.0	S	43.	0.10	4.
40.0	S	49.	0.08	4.
50.0	S	54.	0.12	4.
1.0	M	54.	0.12	4.
1.5	M	44.	0.13	4.
2.5	M	42.	0.13	3.
3.5	M	25.	0.0	1.
4.5	M	15.	0.0	1.

TIME		AVG	STD DEV	OBS
0.0	S	38.	0.05	8.
10.0	S	42.	0.07	8.
20.0	S	41.	0.05	8.
30.0	S	40.	0.06	8.
40.0	S	42.	0.07	8.
50.0	S	54.	0.07	8.
1.0	M	69.	0.06	8.
1.5	M	80.	0.09	8.
2.5	M	59.	0.08	8.
3.5	M	54.	0.04	8.
4.5	M	49.	0.06	8.
5.5	M	47.	0.08	8.
6.5	M	38.	0.09	8.
7.5	M	33.	0.06	8.
8.5	M	33.	0.07	7.
9.5	M	31.	0.09	7.
10.5	M	33.	0.06	6.
11.5	M	41.	0.11	5.
12.5	M	33.	0.05	5.
13.5	M	32.	0.07	5.
14.5	M	25.	0.15	5.
15.5	M	29.	0.06	5.

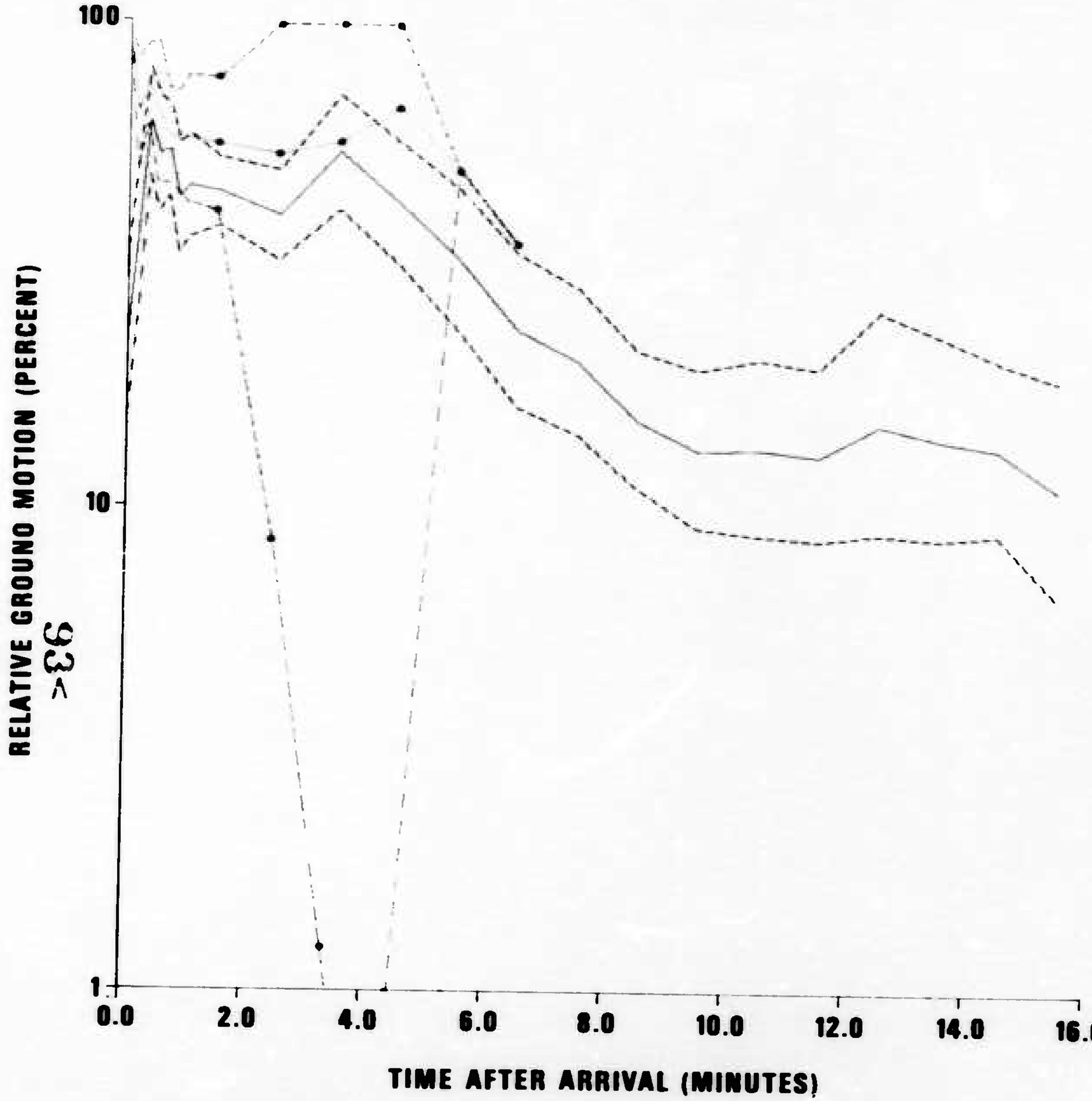
Figure AI-11. Comparison of large-event and small-event coda averages, 110-115°.



TIME		AVG	STD DEV	OBS
0.0	S	80.	0.07	11.
10.0	S	51.	0.08	11.
20.0	S	62.	0.05	11.
30.0	S	47.	0.06	11.
40.0	S	44.	0.05	11.
50.0	S	44.	0.07	11.
1.0	M	40.	0.07	11.
1.5	M	44.	0.08	11.
2.5	M	28.	0.10	9.
3.5	M	36.	0.09	4.
4.5	M	32.	0.06	3.
5.5	M	25.	0.10	3.
6.5	M	22.	0.14	3.
7.5	M	35.	0.0	1.
8.5	M	30.	0.0	1.

TIME		AVG	STD DEV	OBS
0.0	S	37.	0.10	13.
10.0	S	52.	0.09	13.
20.0	S	62.	0.07	13.
30.0	S	61.	0.06	13.
40.0	S	53.	0.07	13.
50.0	S	51.	0.07	13.
1.0	M	45.	0.07	13.
1.5	M	54.	0.06	12.
2.5	M	54.	0.07	12.
3.5	M	40.	0.06	12.
4.5	M	35.	0.05	11.
5.5	M	27.	0.08	11.
6.5	M	26.	0.08	10.
7.5	M	20.	0.09	9.
8.5	M	17.	0.09	9.
9.5	M	17.	0.07	8.
10.5	M	19.	0.10	8.
11.5	M	18.	0.14	8.
12.5	M	14.	0.16	8.
13.5	M	19.	0.14	7.
14.5	M	21.	0.15	6.
15.5	M	15.	0.14	6.

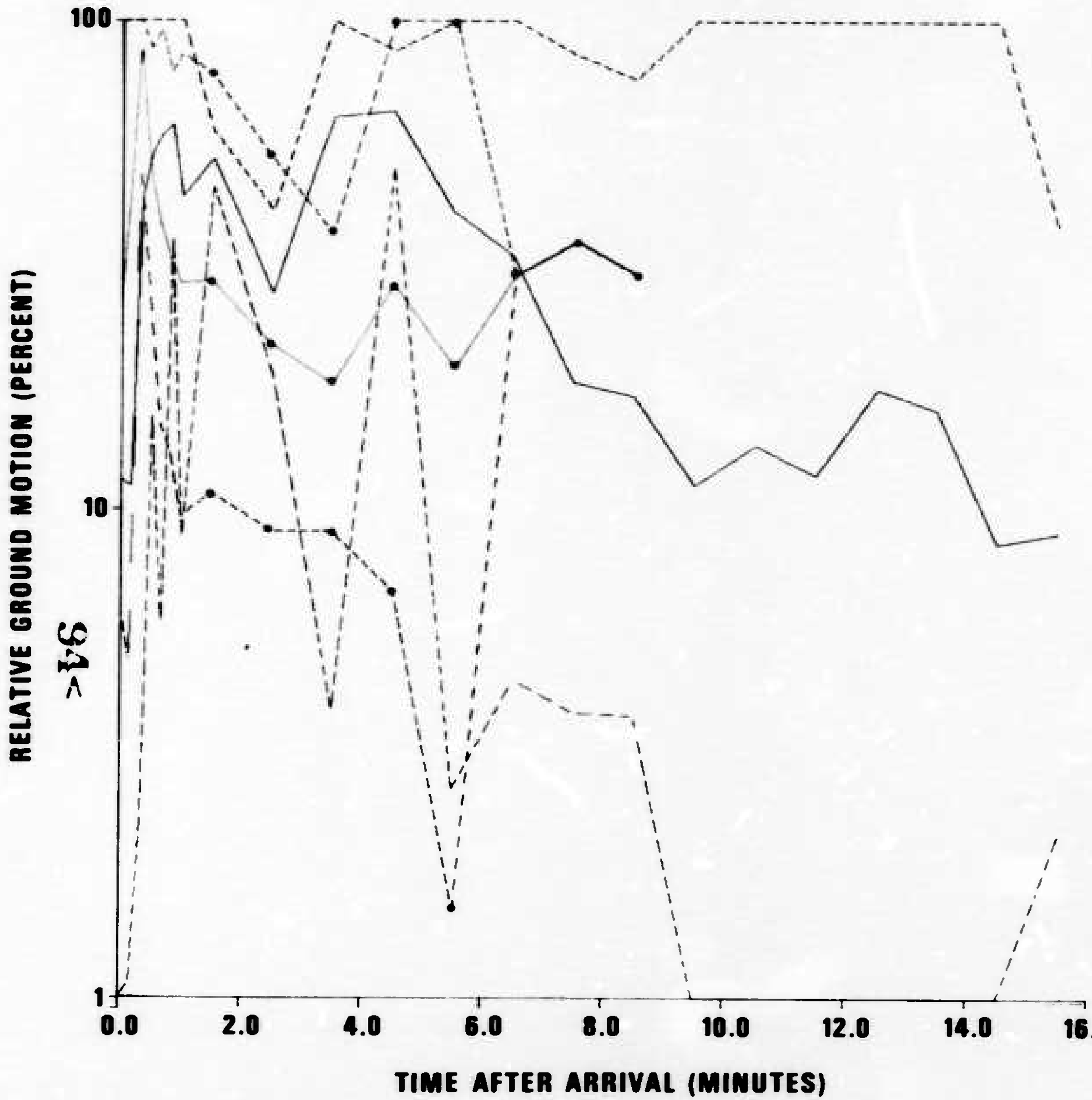
Figure AI-12. Comparison of large-event and small-event coda averages, 118-127°.



TIME	AVG	STD DEV	OBS
0.0 S	100.	0.0	4.
10.0 S	86.	0.04	4.
20.0 S	75.	0.03	4.
30.0 S	66.	0.05	4.
40.0 S	59.	0.03	4.
50.0 S	57.	0.04	4.
1.0 M	58.	0.04	4.
1.5 M	56.	0.04	4.
2.5 M	54.	0.13	3.
3.5 M	57.	0.15	2.
4.5 M	68.	0.13	2.
5.5 M	50.	0.0	2.
6.5 M	35.	0.0	1.

TIME	AVG	STD DEV	OBS
0.0 S	23.	0.08	16.
10.0 S	37.	0.07	16.
20.0 S	62.	0.05	16.
30.0 S	53.	0.06	16.
40.0 S	54.	0.05	16.
50.0 S	43.	0.05	16.
1.0 M	46.	0.05	15.
1.5 M	44.	0.03	15.
2.5 M	40.	0.04	15.
3.5 M	53.	0.06	14.
4.5 M	42.	0.06	14.
5.5 M	32.	0.07	13.
6.5 M	23.	0.07	12.
7.5 M	20.	0.07	12.
8.5 M	16.	0.06	11.
9.5 M	14.	0.07	11.
10.5 M	14.	0.08	11.
11.5 M	13.	0.08	11.
12.5 M	16.	0.10	11.
13.5 M	15.	0.09	11.
14.5 M	14.	0.08	10.
15.5 M	11.	0.10	10.

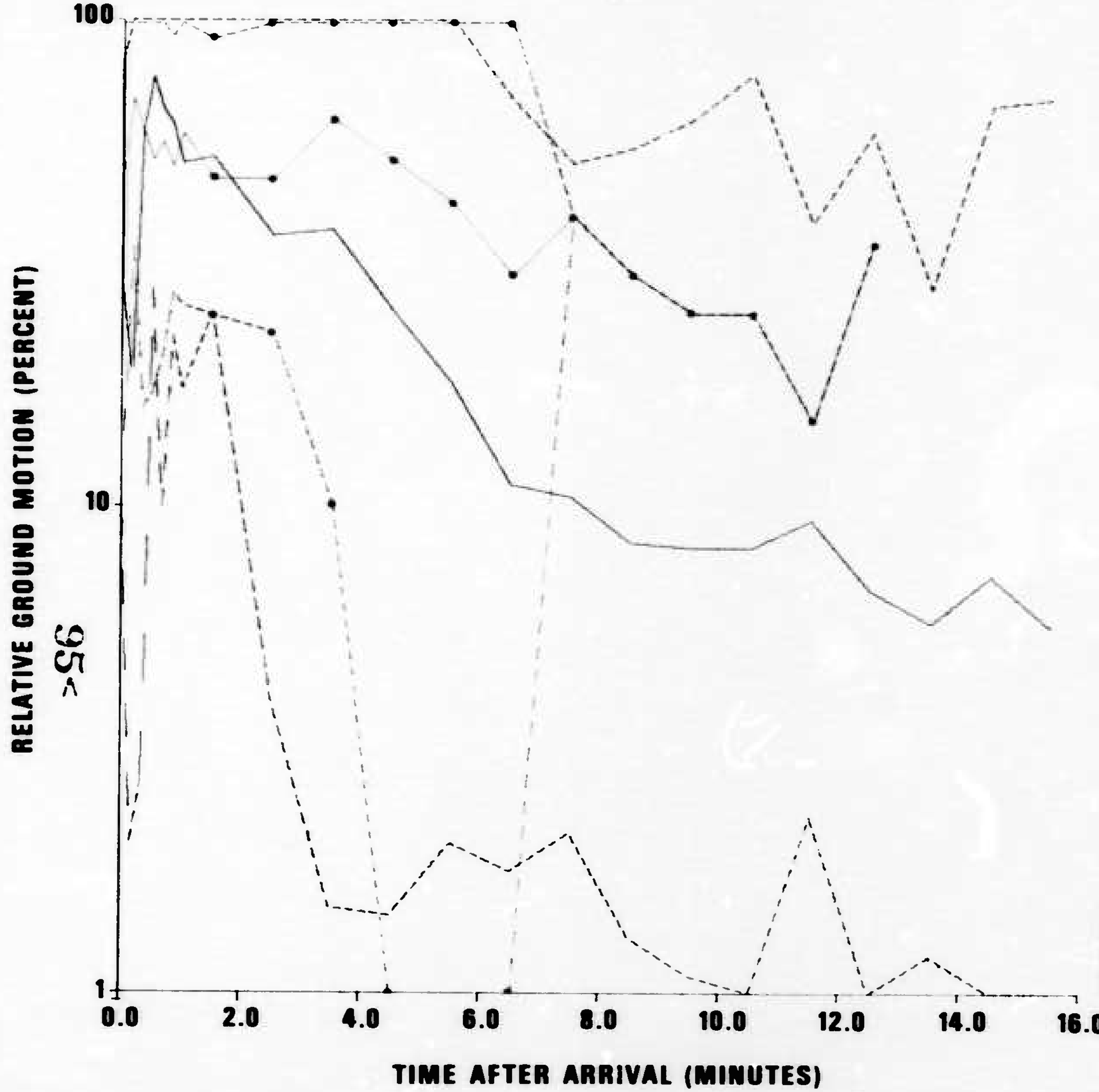
Figure AI-13. Comparison of large-event and small-event coda averages, 127-136°.



TIME	AVG	STD DEV	OBS
0.0 S	26.	0.19	4.
10.0 S	43.	0.20	4.
20.0 S	50.	0.05	4.
30.0 S	49.	0.08	4.
40.0 S	38.	0.13	4.
50.0 S	33.	0.12	4.
1.0 M	29.	0.15	4.
1.5 M	30.	0.13	4.
2.5 M	22.	0.09	3.
3.5 M	19.	0.07	3.
4.5 M	29.	0.14	3.
5.5 M	20.	0.21	3.
6.5 M	30.	0.0	1.
7.5 M	35.	0.0	1.
8.5 M	30.	0.0	1.

TIME	AVG	STD DEV	OBS
0.0 S	12.	0.24	3.
10.0 S	12.	0.23	3.
20.0 S	44.	0.19	3.
30.0 S	54.	0.09	3.
40.0 S	59.	0.14	3.
50.0 S	62.	0.05	3.
1.0 M	43.	0.12	3.
1.5 M	52.	0.01	3.
2.5 M	28.	0.04	3.
3.5 M	64.	0.16	3.
4.5 M	66.	0.03	3.
5.5 M	40.	0.18	3.
6.5 M	33.	0.16	3.
7.5 M	19.	0.16	3.
8.5 M	17.	0.15	3.
9.5 M	12.	0.21	2.
10.5 M	14.	0.28	2.
11.5 M	12.	0.29	2.
12.5 M	18.	0.10	2.
13.5 M	16.	0.12	2.
14.5 M	9.	0.15	2.
15.5 M	5.	0.05	2.

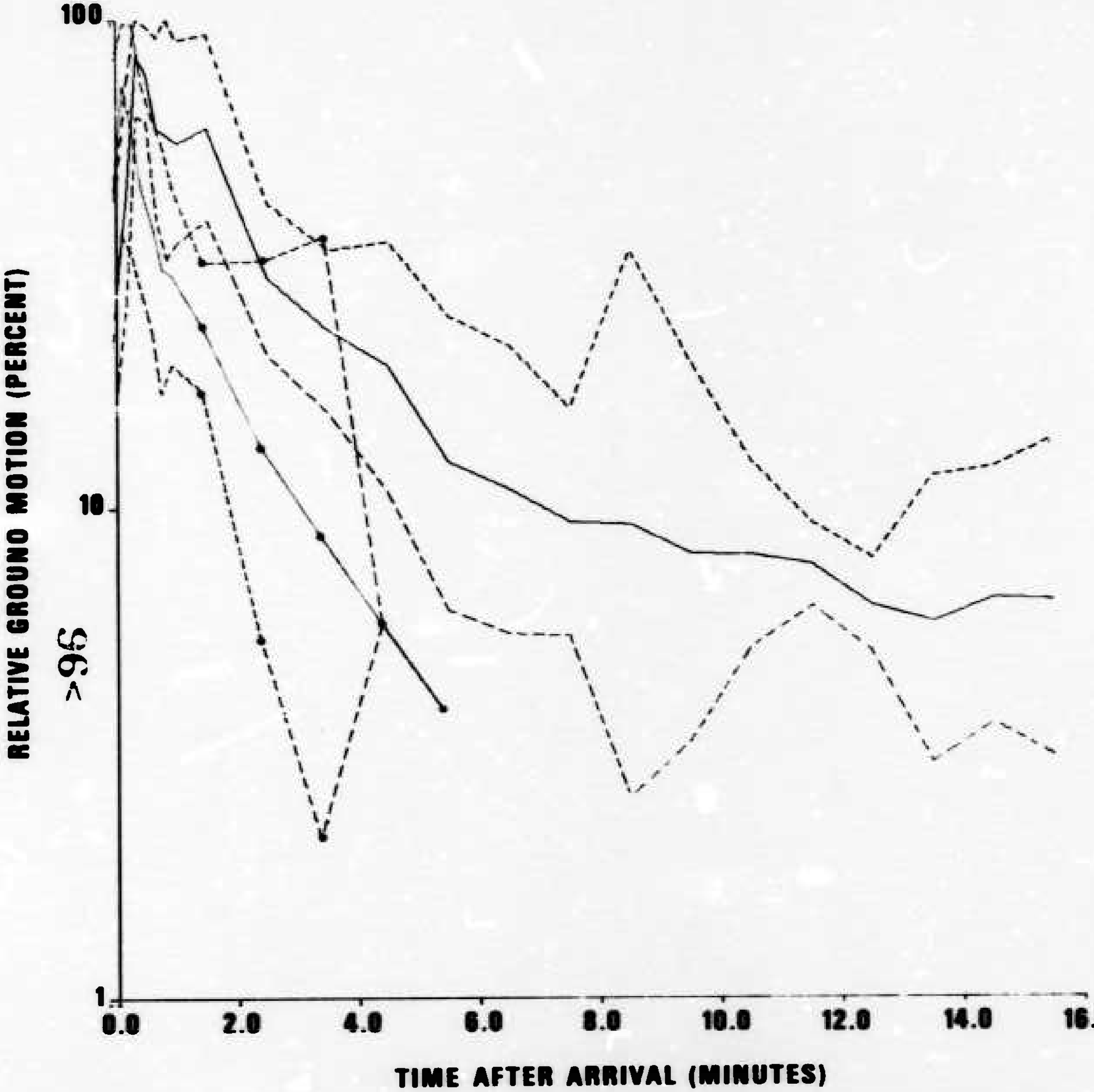
Figure AI-14. Comparison of large-event and small-event coda averages, 136-140°.



TIME		AVG	STD DEV	OBS
0.0	S	48.	0.15	4.
10.0	S	71.	0.07	4.
20.0	S	41.	0.12	4.
30.0	S	53.	0.12	4.
40.0	S	58.	0.11	4.
50.0	S	52.	0.08	4.
1.0	M	60.	0.09	4.
1.5	M	45.	0.08	4.
2.5	M	49.	0.07	3.
3.5	M	64.	0.11	3.
4.5	M	53.	0.05	2.
5.5	M	43.	0.09	2.
6.5	M	30.	0.19	2.
7.5	M	40.	0.0	1.
8.5	M	30.	0.0	1.
9.5	M	25.	0.0	1.
10.5	M	25.	0.0	1.
11.5	M	15.	0.0	1.
12.5	M	35.	0.0	1.

TIME		AVG	STD DEV	OBS
0.0	S	29.	0.11	3.
10.0	S	19.	0.20	3.
20.0	S	60.	0.18	3.
30.0	S	77.	0.06	3.
40.0	S	67.	0.12	3.
50.0	S	62.	0.08	3.
1.0	M	52.	0.09	3.
1.5	M	53.	0.07	3.
2.5	M	37.	0.16	3.
3.5	M	38.	0.21	3.
4.5	M	26.	0.21	3.
5.5	M	18.	0.20	3.
6.5	M	12.	0.18	3.
7.5	M	11.	0.16	3.
8.5	M	9.	0.19	3.
9.5	M	9.	0.20	3.
10.5	M	9.	0.23	3.
11.5	M	10.	0.14	3.
12.5	M	7.	0.22	3.
13.5	M	6.	0.16	3.
14.5	M	8.	0.22	3.
15.5	M	6.	0.25	3.

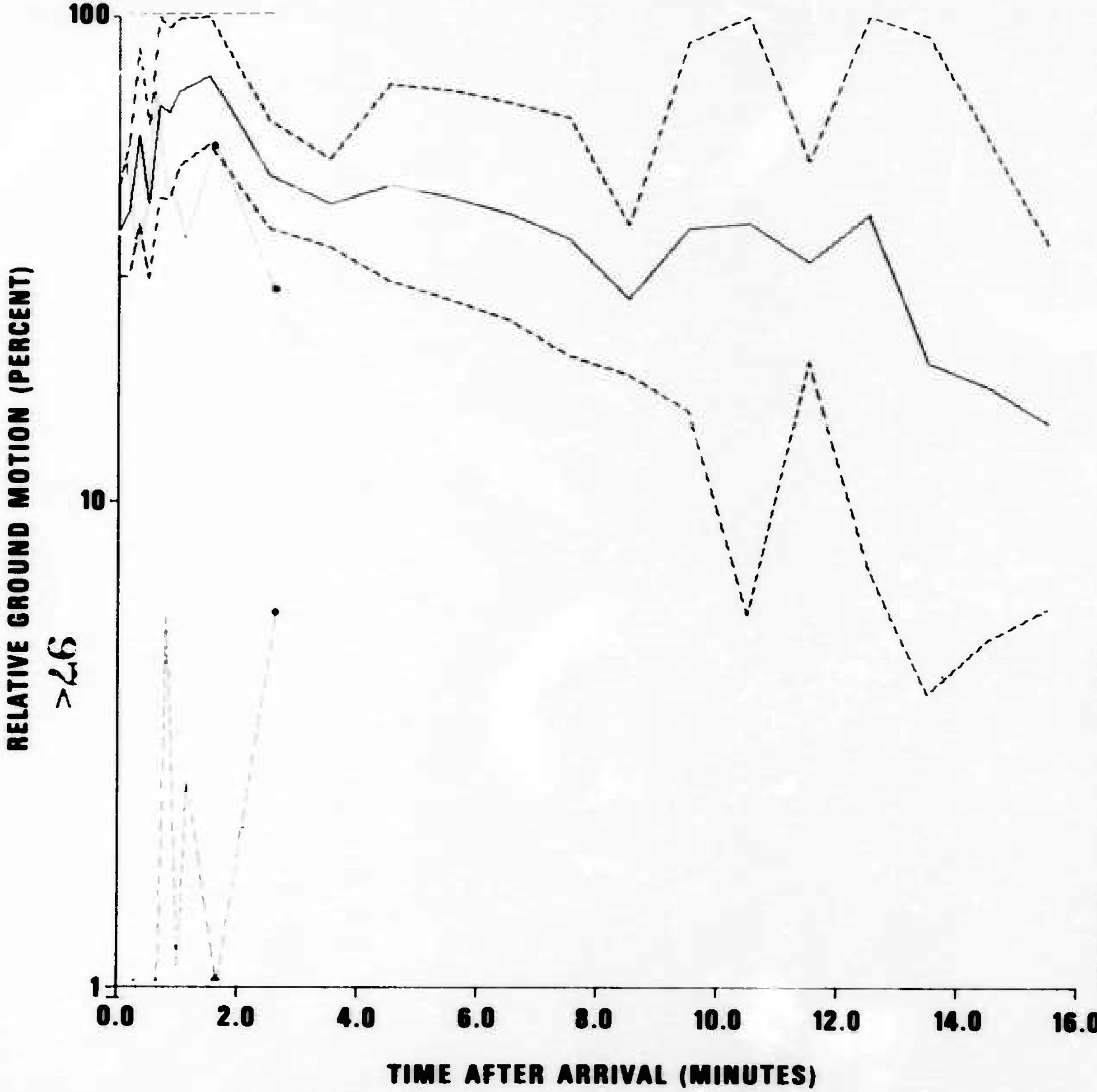
Figure AI-15. Comparison of large-event and small-event coda averages, 140-145°.



TIME		AVG	STD DEV	OBS
0.0	S	40.	0.12	6.
10.0	S	76.	0.28	6.
20.0	S	61.	0.09	6.
30.0	S	46.	0.08	6.
40.0	S	40.	0.09	6.
50.0	S	32.	0.10	6.
1.0	M	31.	0.07	6.
1.5	M	[illegible]	0.05	6.
2.5	M	[illegible]	0.09	3.
3.5	M	9.	0.05	2.
4.5	M	6.	0.0	1.
5.5	M	4.	0.0	1.

TIME		AVG	STD DEV	OBS
0.0	S	29.	0.08	5.
10.0	S	45.	0.08	5.
20.0	S	85.	0.03	5.
30.0	S	78.	0.03	5.
40.0	S	61.	0.07	5.
50.0	S	59.	0.09	5.
1.0	M	57.	0.07	5.
1.5	M	61.	0.07	5.
2.5	M	30.	0.06	5.
3.5	M	23.	0.06	5.
4.5	M	20.	0.09	5.
5.5	M	13.	0.11	5.
6.5	M	11.	0.10	5.
7.5	M	10.	0.07	4.
8.5	M	10.	0.18	4.
9.5	M	9.	0.12	4.
10.5	M	9.	0.06	4.
11.5	M	8.	0.02	3.
12.5	M	7.	0.02	3.
13.5	M	6.	0.07	3.
14.5	M	7.	0.06	3.
15.5	M	7.	0.08	3.

Figure AI-16. Comparison of large-event and small-event coda averages, 145-155°.



TIME	AVG	STD DEV	OBS
0.0 S	53.	0.12	2.
10.0 S	34.	0.[illegible]	2.
20.0 S	35.	0.11	2.
30.0 S	71.	0.15	2.
40.0 S	45.	0.05	2.
50.0 S	42.	0.08	2.
1.0 M	35.	0.[illegible]	2.
1.5 M	55.	0.24	2.
2.5 M	27.	0.05	2.

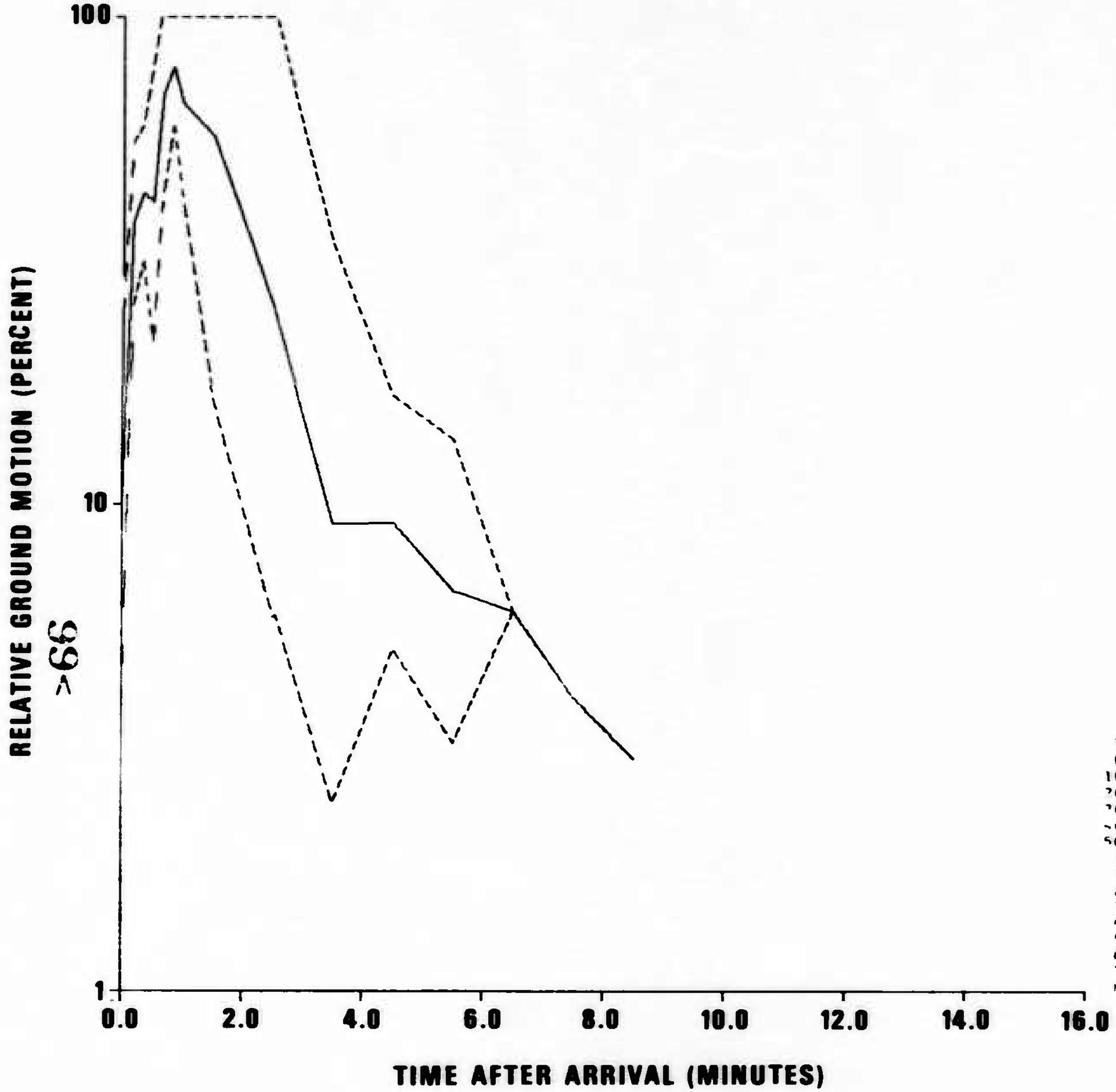
TIME	AVG	STD DEV	OBS
0.0 S	37.	0.04	7.
10.0 S	41.	0.06	7.
20.0 S	58.	0.07	7.
30.0 S	42.	0.07	7.
40.0 S	66.	0.08	7.
50.0 S	64.	0.07	7.
1.0 M	71.	0.06	7.
1.5 M	76.	0.05	7.
2.5 M	48.	0.04	7.
3.5 M	42.	0.04	7.
4.5 M	46.	0.08	7.
5.5 M	43.	0.09	7.
6.5 M	40.	0.09	5.
7.5 M	35.	0.09	5.
8.5 M	27.	0.06	5.
9.5 M	37.	0.09	3.
10.5 M	38.	0.14	3.
11.5 M	32.	0.05	3.
12.5 M	40.	0.13	3.
13.5 M	20.	0.16	3.
14.5 M	18.	0.12	3.
15.5 M	15.	0.09	3.

Figure AI-17. Comparison of large-event and small-event coda averages, 155-166°.

APPENDIX II

Small-event coda averages; dashed lines with dots indicate ± one standard deviation of the individual coda observations.

1. 0-5°
2. 5-10°
3. 10-14°
4. 14-16°
5. 16-21°
6. 21-22°
7. 22-24°
8. 24-26°
9. 26-29°
10. 29-31°
11. 31-42°
12. 42-53°
13. 53-56°
14. 56-59°
15. 59-63°
16. 63-67°
17. 67-72°
18. 72-79°
19. 79-84°
20. 84-98°
21. 98-103°
22. 110-115°
23. 118-127°
24. 127-136°
25. 136-140°
26. 140-145°
27. 145-155°
28. 155-166°



TIME		AVG	STD DEV	OBS
0.0	S	11.	0.34	3.
10.0	S	[illegible]	0.17	3.
20.0	S	44.	0.14	3.
30.0	S	47.	[illegible]	3.
40.0	S	70.	0.13	3.
50.0	S	79.	0.11	3.
1.0	M	67.	[illegible]	3.
1.5	M	57.	[illegible]	3.
2.5	M	24.	[illegible]	3.
3.5	M	10.	[illegible]	3.
4.5	M	10.	[illegible]	2.
5.5	M	7.	[illegible]	2.
6.5	M	7.	[illegible]	1.
7.5	M	5.	0.0	1.
8.5	M	4.	0.0	1.

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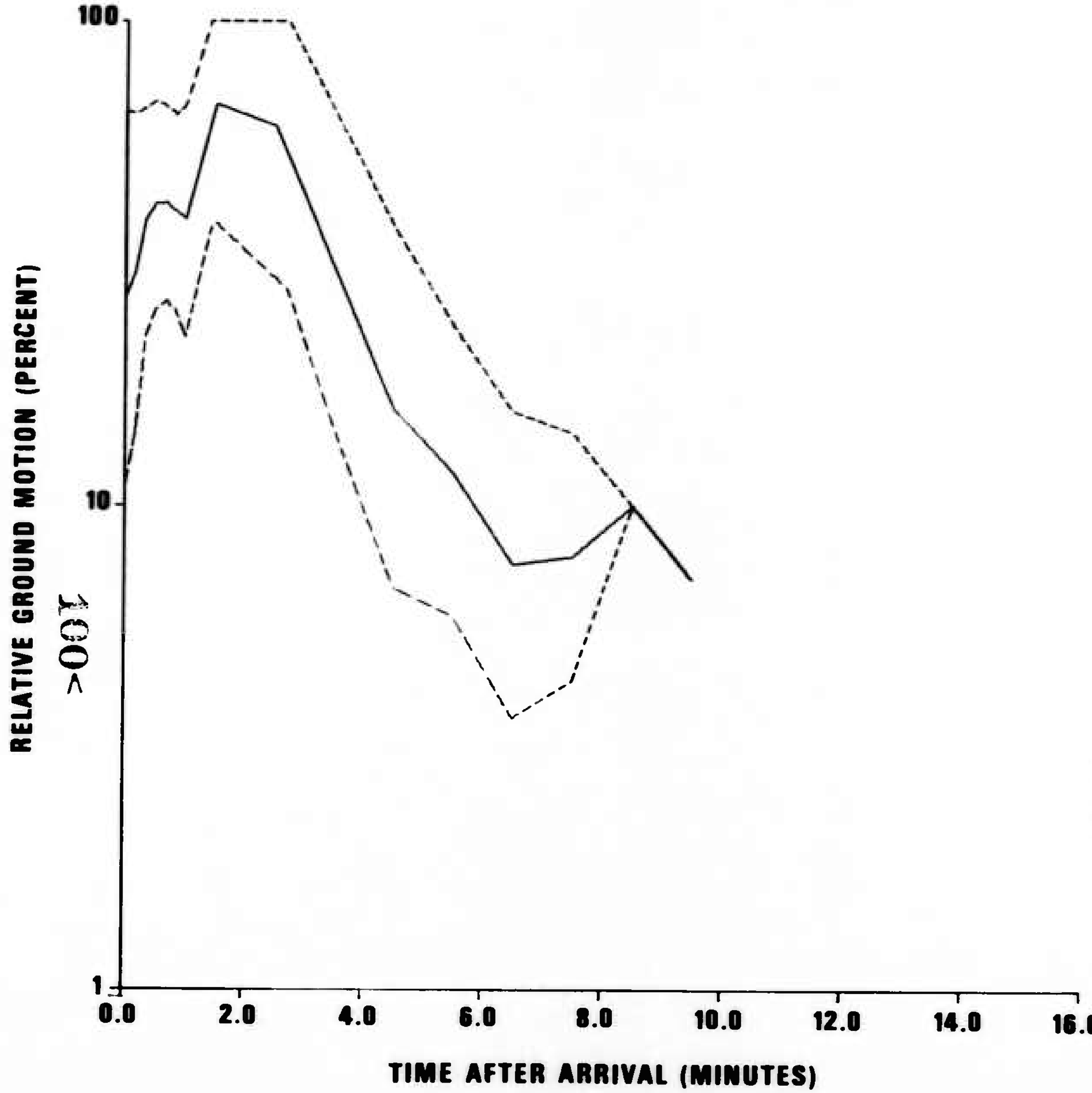
Figure AII-1. Small-event coda averages 0-5°



TIME		AVG	STD DEV	OBS
0.0	S	27.	0.[illegible]	21.
10.0	S	[illegible]	0.[illegible]	21.
20.0	S	[illegible]	0.24	21.
30.0	S	42.	0.[illegible]	21.
40.0	S	42.	0.20	21.
50.0	S	40.	0.[illegible]	21.
1.0	M	[illegible]	0.24	21.
1.5	M	[illegible]	0.[illegible]	21.
2.5	M	61.	0.27	20.
3.5	M	[illegible]	0.[illegible]	20.
4.5	M	16.	0.[illegible]	15.
5.5	M	12.	0.[illegible]	10.
6.5	M	[illegible]	0.[illegible]	4.
7.5	M	[illegible]	0.[illegible]	3.
8.5	M	11.	0.0	1.
9.5	M	9.	0.0	1.

Figure AII-2. Small-event coda averages 5-10°

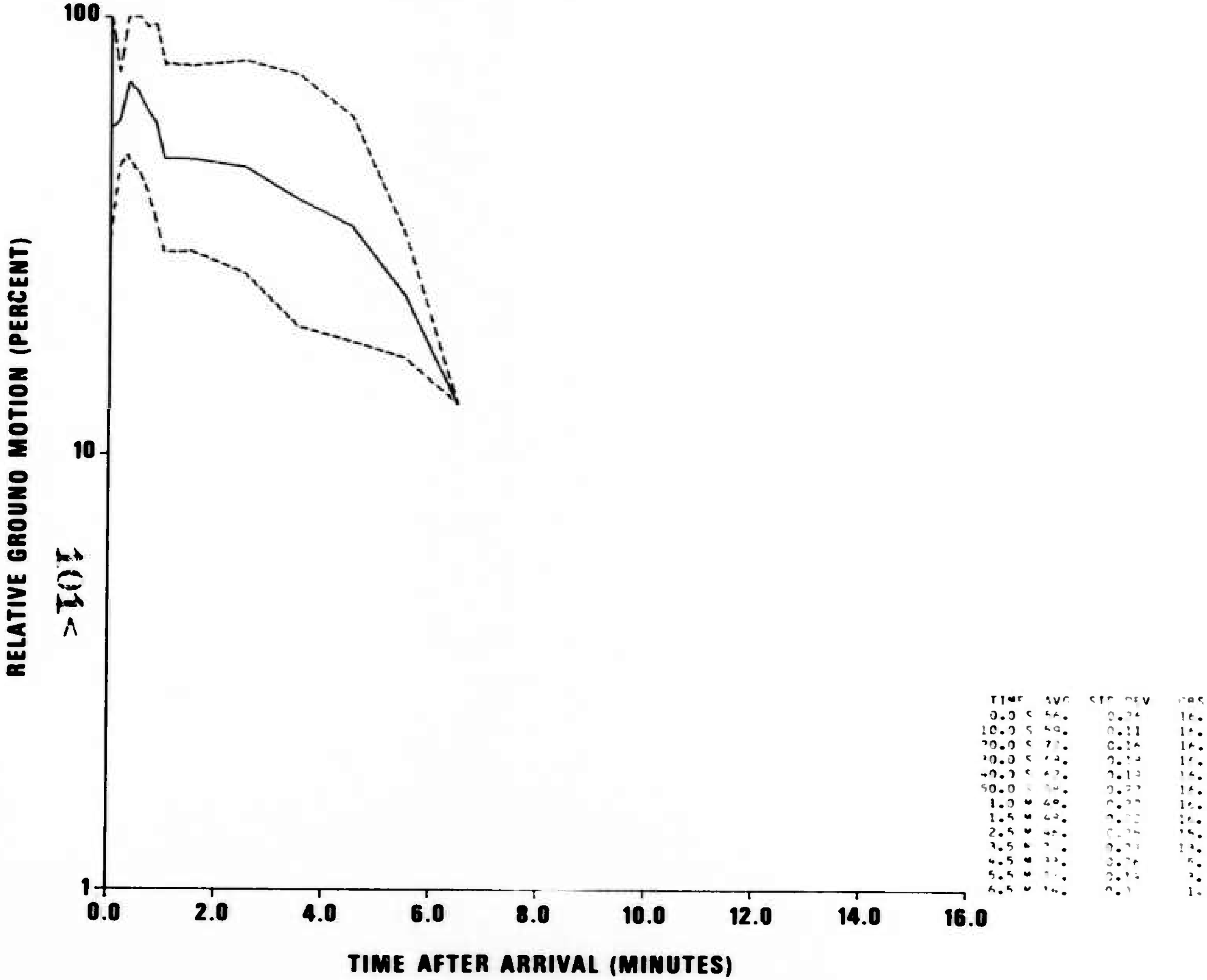
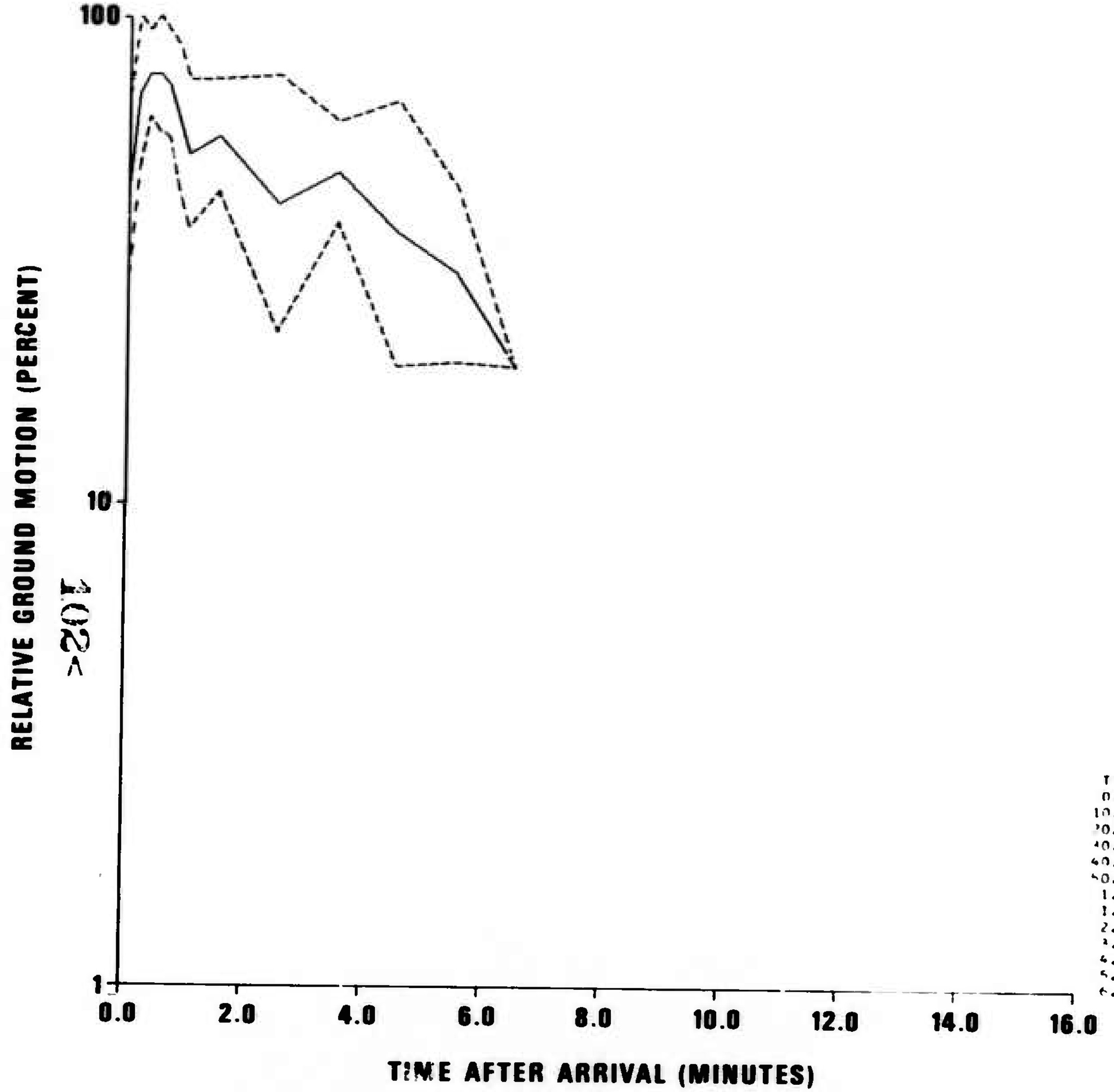
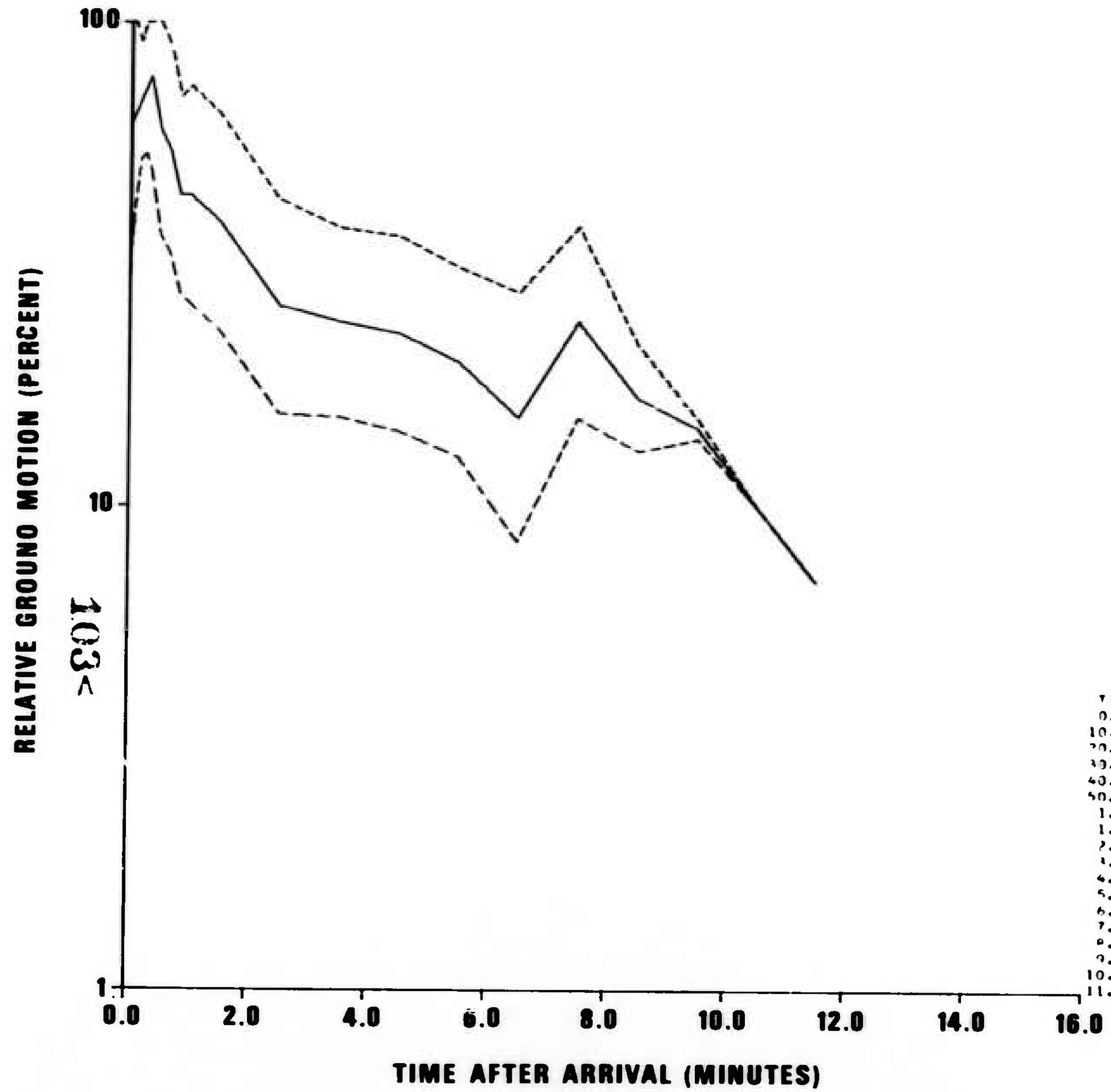


Figure AII-3. Small-event coda averages 10-14°



TIME	AVG	STD DEV	CAS
0.0 S	45.	0.15	10.
10.0 S	71.	0.16	10.
20.0 S	74.	[illegible]	10.
[illegible]0.0 S	77.	0.12	10.
40.0 S	74.	0.11	10.
50.0 S	[illegible]	0.15	10.
1.0 M	53.	[illegible]	10.
1.5 M	54.	[illegible]	10.
2.5 M	42.	[illegible]	10.
3.5 M	[illegible]	0.11	[illegible]
4.5 M	37.	[illegible]	[illegible]
5.5 M	[illegible]	[illegible]	[illegible]
6.5 M	[illegible]	[illegible]	1.

Figure AII-4. Small-event coda averages 14-16°



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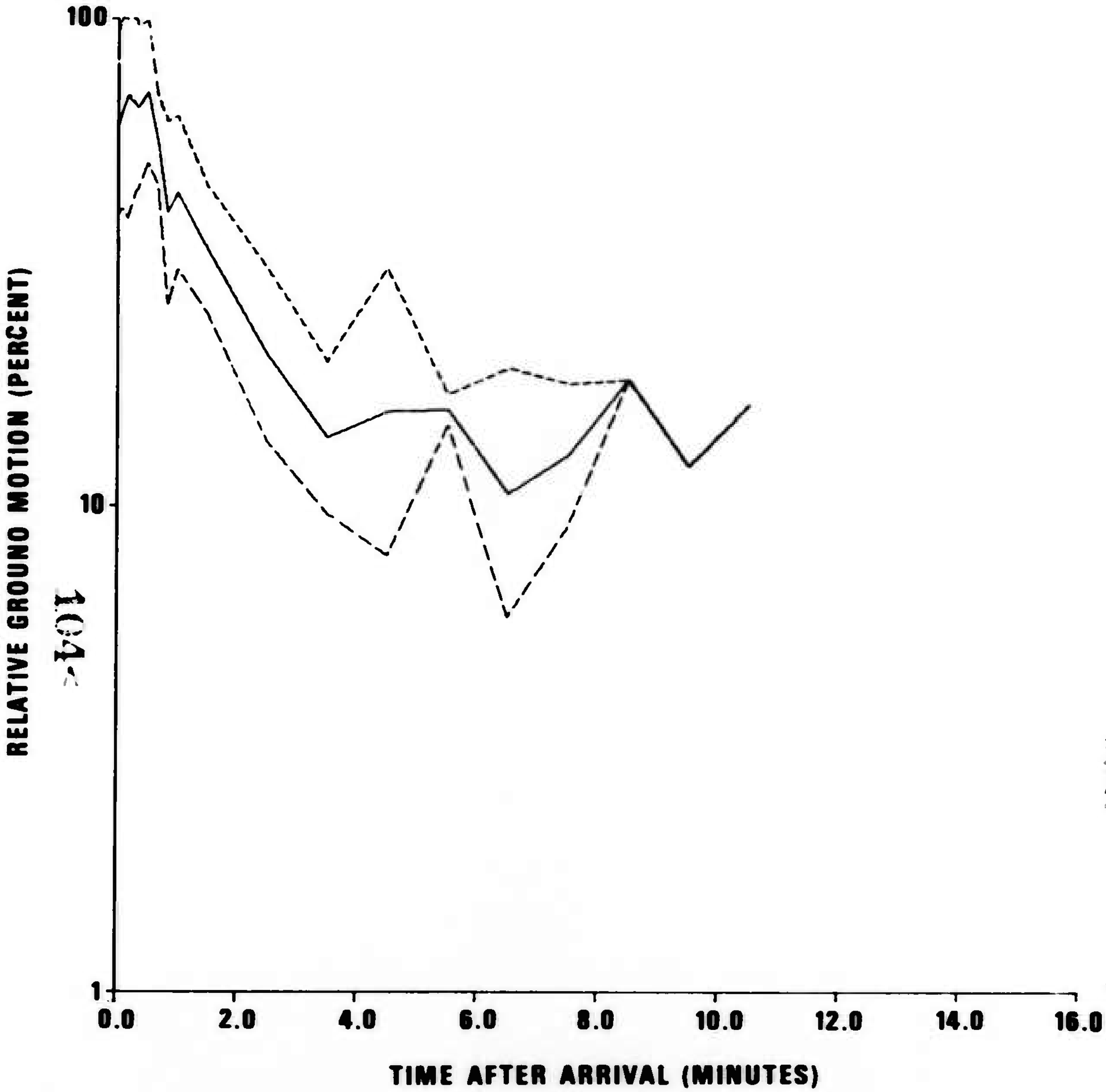
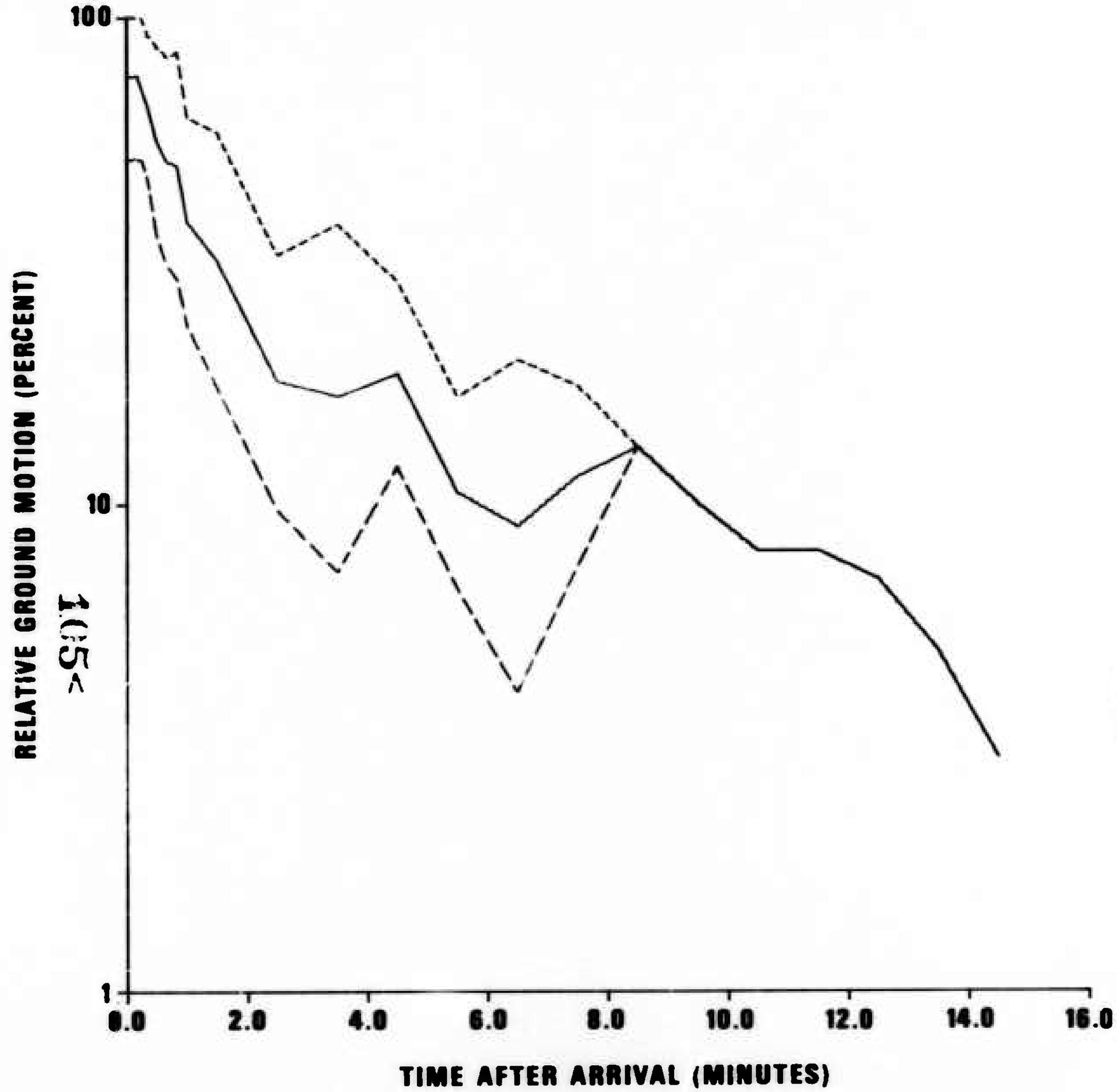
TIME		AVG	STD DEV	OBS
0.0	S	62.	0.24	25.
10.0	S	65.	0.12	25.
20.0	S	74.	0.15	25.
30.0	S	61.	0.22	25.
40.0	S	55.	0.22	25.
50.0	S	44.	0.21	25.
1.0	M	44.	0.23	25.
1.5	M	[illegible]	0.23	24.
2.5	M	26.	0.22	21.
3.5	M	24.	0.20	16.
4.5	M	21.	0.20	13.
5.5	M	20.	0.19	11.
6.5	M	16.	[illegible]	8.
7.5	M	24.	[illegible]	4.
8.5	M	17.	0.11	2.
9.5	M	15.	0.17	2.
10.5	M	11.	0.0	1.
11.5	M	[illegible]	0.0	1.

Figure AII-5. Small-event coda averages 16-21°



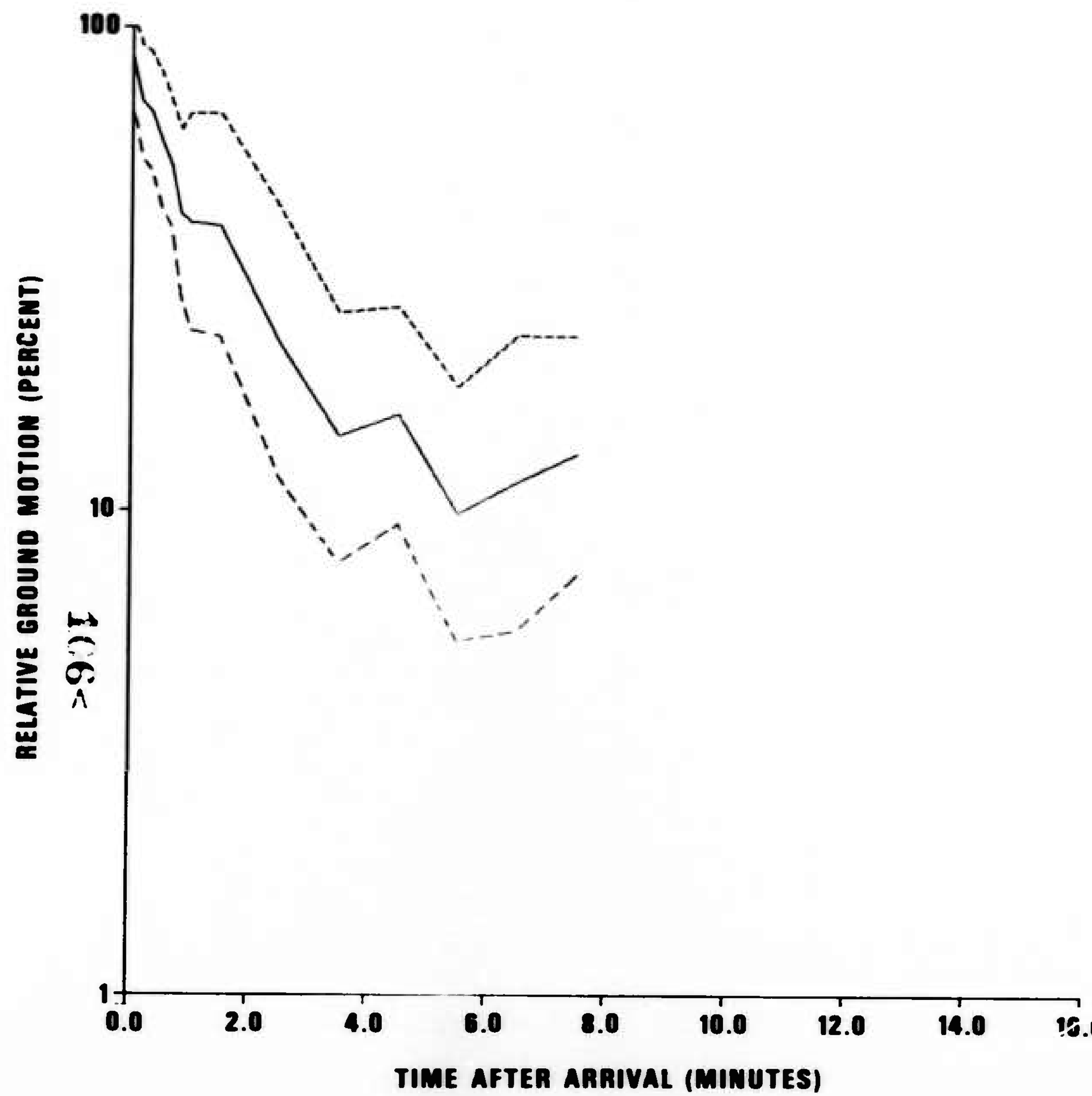
TIME		AVG	STD DEV	OBS
0.0	S	61.	0.15	7.
10.0	S	70.	0.[illegible]1	7.
20.0	S	66.	0.17	7.
30.0	S	71.	0.15	7.
40.0	S	57.	0.09	7.
50.0	S	40.	0.19	7.
1.0	M	44.	0.15	7.
1.5	M	34.	0.13	7.
2.5	M	21.	0.14	5.
3.5	M	14.	0.15	5.
4.5	M	15.	0.[illegible]	5.
5.5	M	15.	0.04	3.
6.5	M	11.	0.25	2.
7.5	M	12.	0.14	2.
8.5	M	16.	0.0	1.
9.5	M	13.	0.0	1.
10.5	M	17.	0.0	1.

Figure AII-6. Small-event coda averages 21-22°



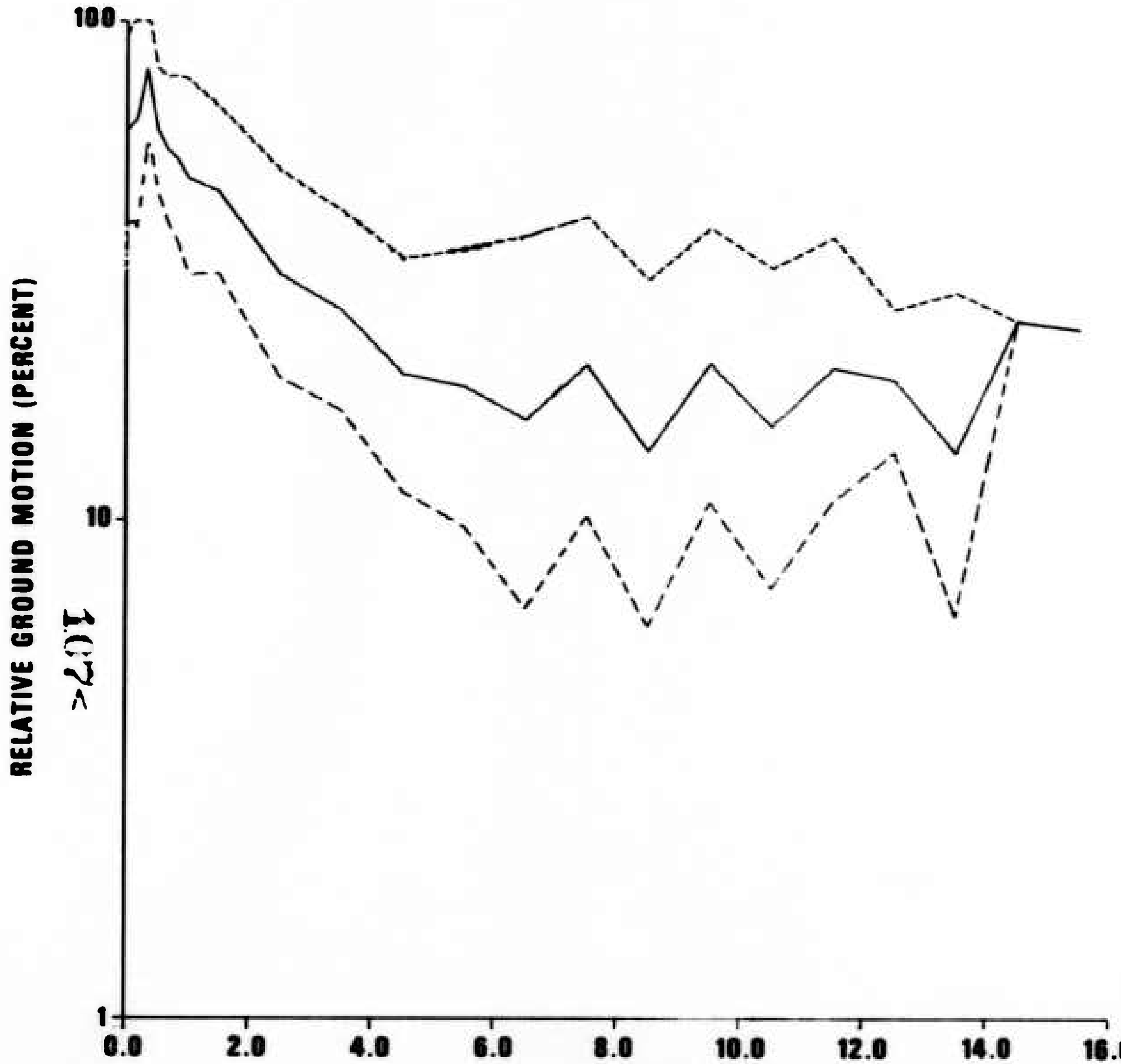
TIME		AVG	STD DEV	OBS
0.0	S	76.	0.15	11.
10.0	S	77.	0.14	11.
20.0	S	67.	0.14	11.
30.0	S	56.	0.19	11.
40.0	S	51.	0.21	11.
50.0	S	50.	0.23	11.
1.0	M	39.	0.21	11.
1.5	M	33.	0.26	11.
2.5	M	19.	0.26	10.
3.5	M	17.	0.36	9.
4.5	M	19.	0.19	9.
5.5	M	11.	0.19	7.
6.5	M	10.	0.34	6.
7.5	M	12.	0.19	3.
8.5	M	14.	0.0	1.
9.5	M	11.	0.0	1.
10.5	M	9.	0.0	1.
11.5	M	[illegible]	0.0	1.
12.5	M	5.	0.0	1.
13.5	M	[illegible]	0.0	1.
14.5	M	4.	0.0	1.

Figure AII-7. Small-event coda averages 22-24°



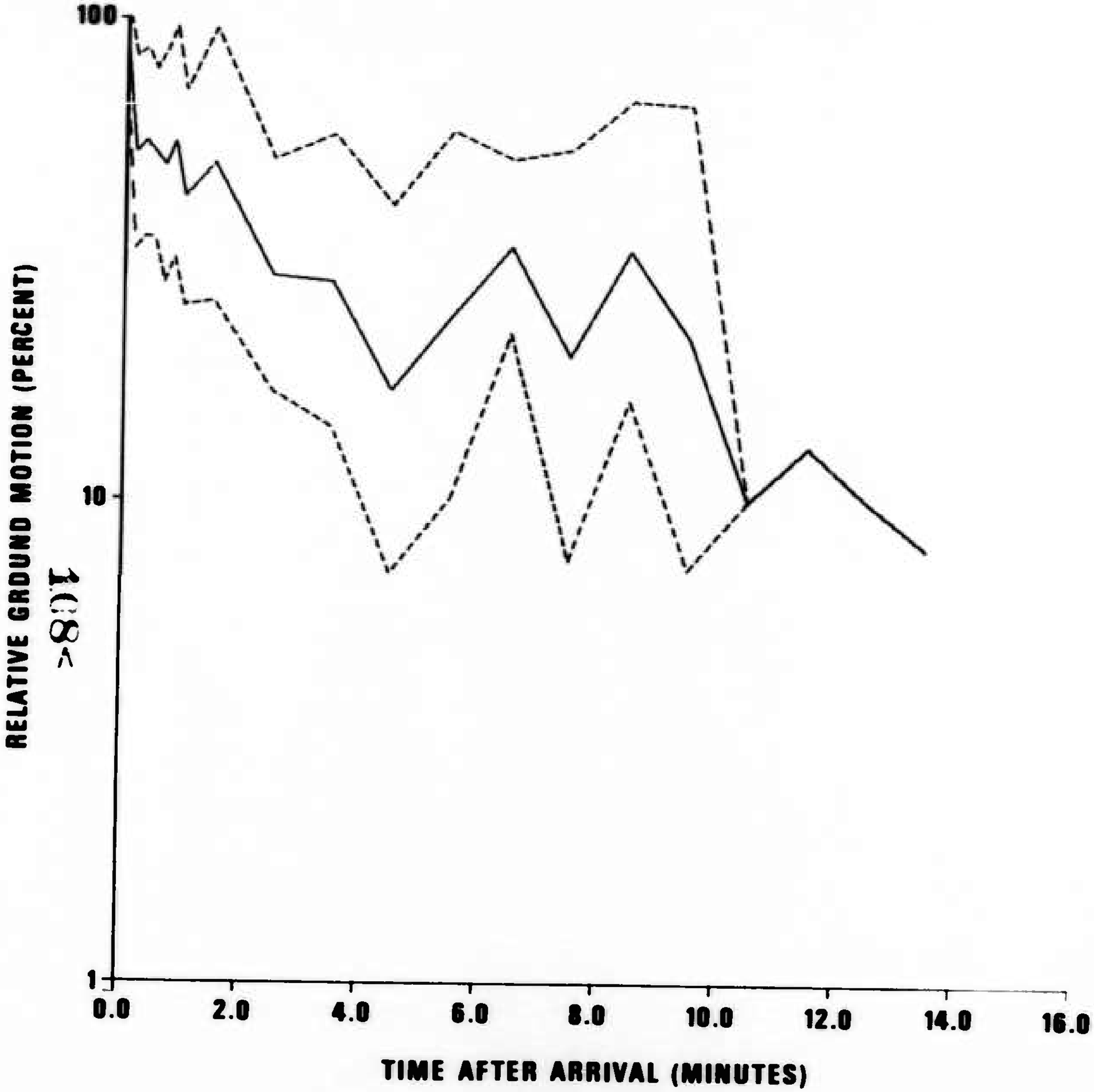
TIME		AVG	STD DEV	OBS
0.0	S	87.	0.09	6.
10.0	S	71.	0.12	6.
20.0	S	67.	0.12	6.
30.0	S	59.	0.14	6.
40.0	S	53.	0.13	6.
50.0	S	42.	0.18	6.
1.0	M	40.	0.23	6.
1.5	M	39.	0.23	6.
2.5	M	23.	0.28	6.
3.5	M	15.	0.26	5.
4.5	M	16.	0.27	5.
5.5	M	10.	0.26	5.
6.5	M	12.	0.30	4.
7.5	M	14.	0.24	3.

Figure AII-8. Small-event coda averages 24-26°



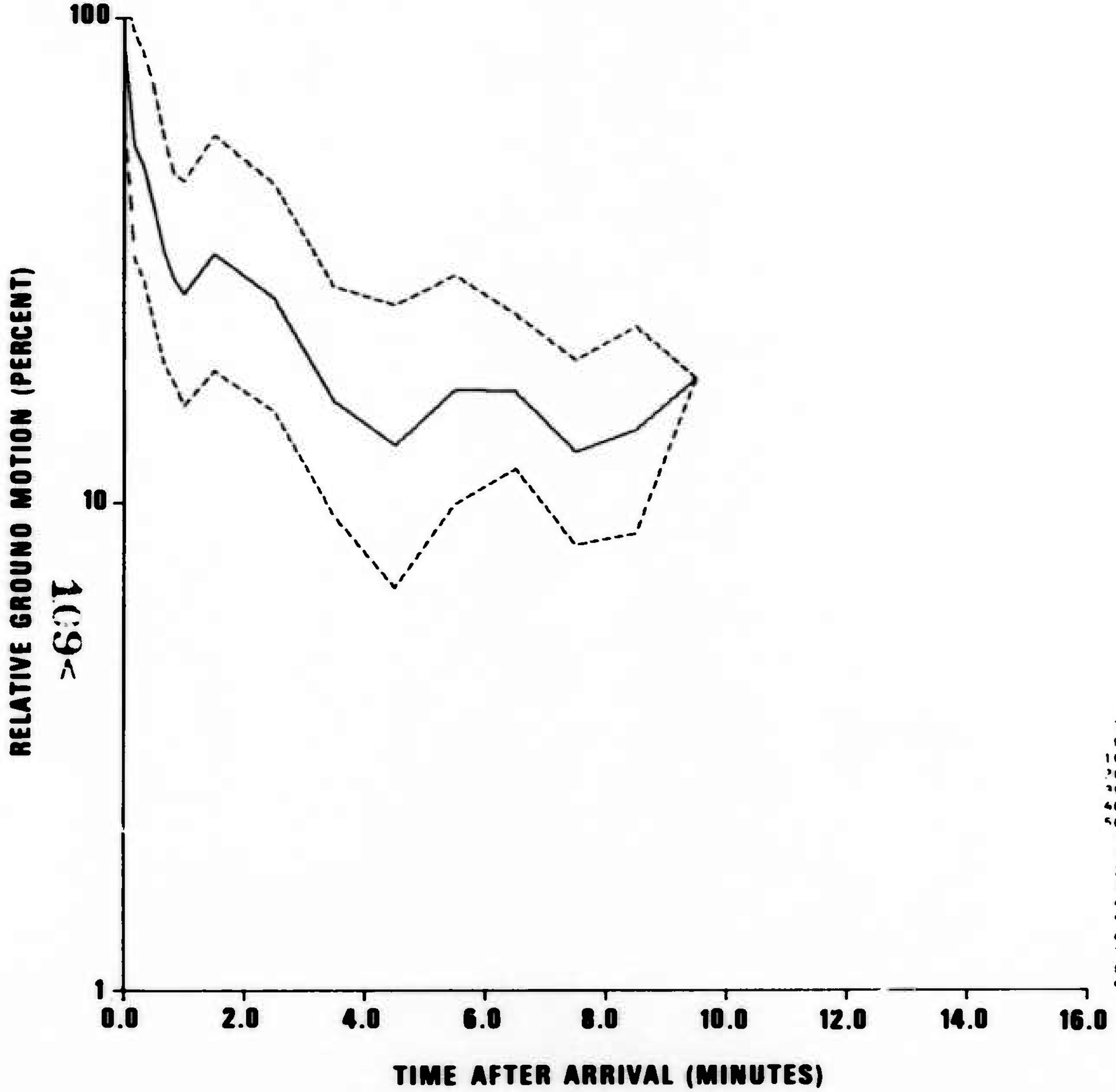
TIME		AVG	STD DEV	OBS
0.0	S	62.	0.19	22.
10.0	S	65.	0.20	22.
20.0	S	81.	0.12	22.
30.0	S	61.	0.12	22.
40.0	S	56.	0.14	22.
50.0	S	54.	0.17	22.
1.0	M	49.	0.20	22.
1.5	M	47.	0.17	22.
2.5	M	32.	0.21	22.
3.5	M	27.	0.20	18.
4.5	M	20.	0.24	15.
5.5	M	19.	0.29	13.
6.5	M	16.	0.38	11.
7.5	M	21.	0.30	10.
8.5	M	14.	0.35	10.
9.5	M	21.	0.29	5.
10.5	M	16.	0.32	3.
11.5	M	21.	0.27	2.
12.5	M	19.	0.14	2.
13.5	M	14.	0.32	2.
14.5	M	26.	0.0	1.
15.5	M	25.	0.0	1.

Figure AII-9. Small-event coda averages 26-29°



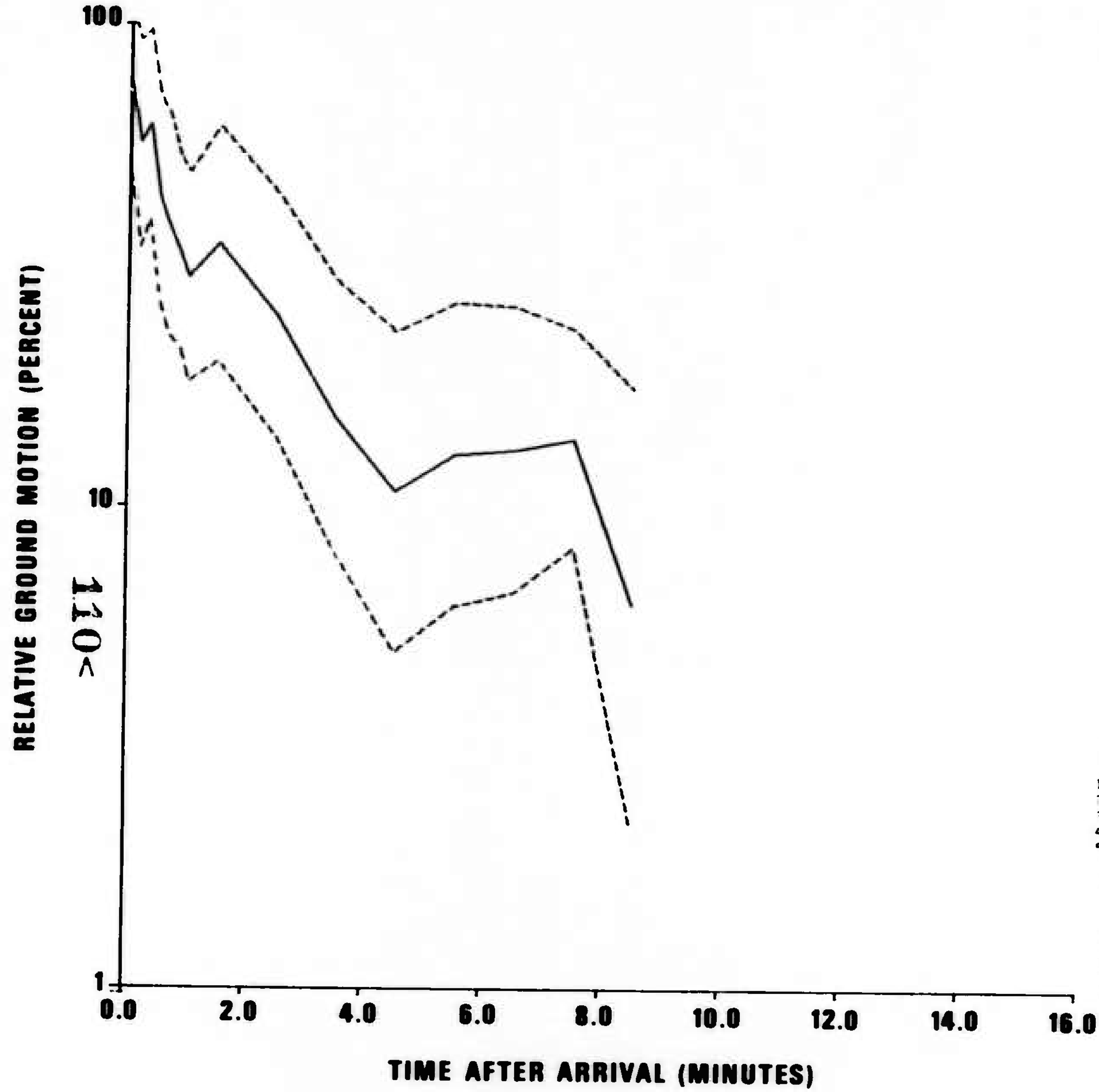
TIME		AVG	STD DEV	OBS
0.0	S	88.	0.09	8.
10.0	S	53.	0.20	8.
20.0	S	56.	0.20	8.
30.0	S	53.	0.18	8.
40.0	S	50.	0.24	8.
50.0	S	56.	0.24	8.
1.0	M	43.	0.22	8.
1.5	M	50.	0.28	8.
2.5	M	30.	0.24	8.
3.5	M	29.	0.30	6.
4.5	M	18.	0.39	4.
5.5	M	25.	0.39	3.
6.5	M	34.	0.18	3.
7.5	M	21.	0.43	3.
8.5	M	34.	0.31	2.
9.5	M	22.	0.48	2.
10.5	M	11.	0.0	1.
11.5	M	14.	0.0	1.
12.5	M	11.	0.0	1.
13.5	M	9.	0.0	1.

Figure AII-10. Small-event coda averages 29-31°



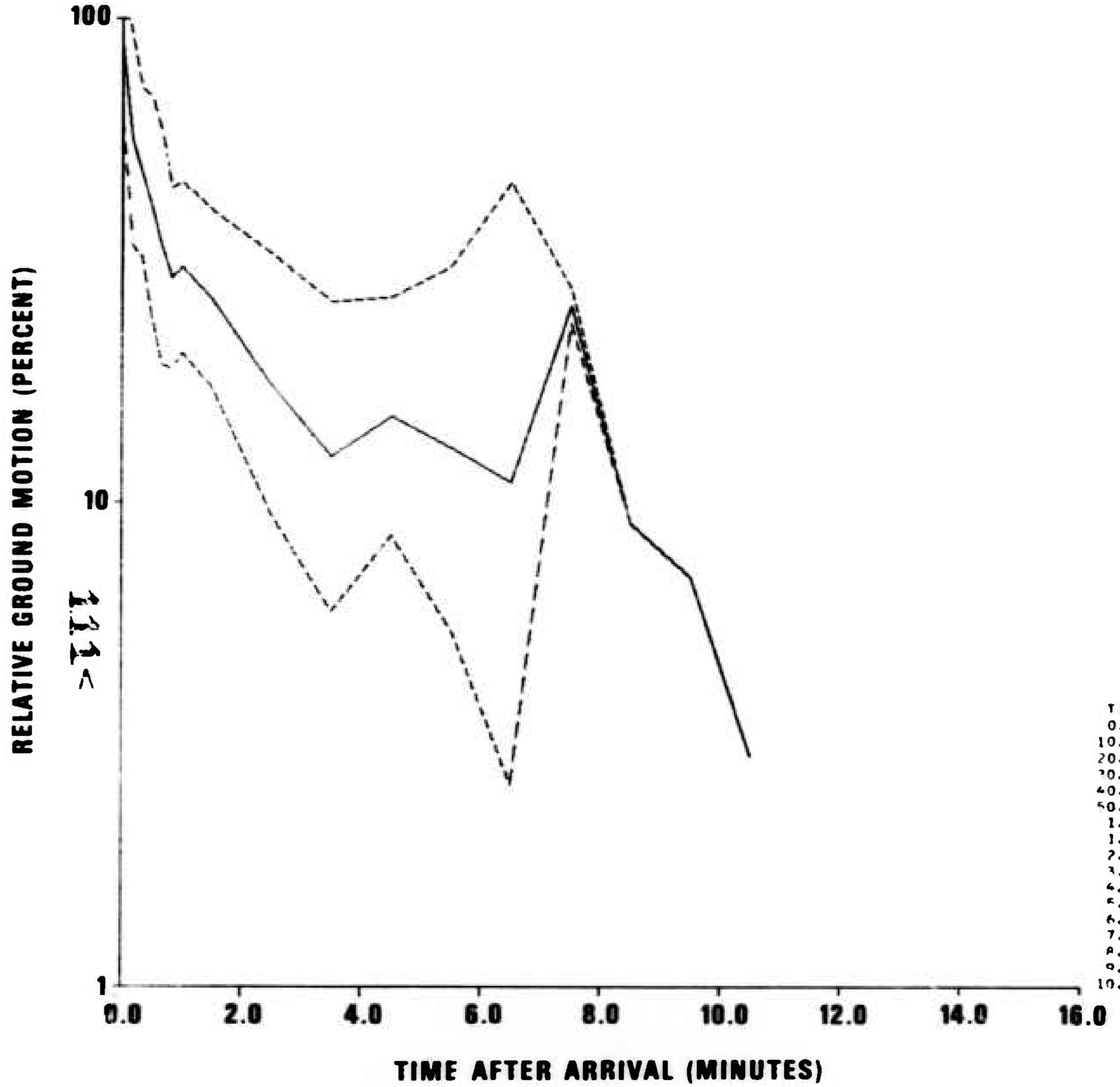
TIME		AVG	STD DEV	OBS
0.0	S	87.	0.11	34.
10.0	S	55.	0.23	34.
20.0	S	50.	0.23	34.
30.0	S	41.	0.24	34.
40.0	S	34.	0.23	34.
50.0	S	30.	0.21	34.
1.0	M	28.	0.23	34.
1.5	M	33.	0.24	34.
2.5	M	27.	0.23	30.
3.5	M	17.	0.24	27.
4.5	M	14.	0.29	18.
5.5	M	18.	0.24	13.
6.5	M	17.	0.16	10.
7.5	M	13.	0.19	6.
8.5	M	15.	0.21	2.
9.5	M	19.	0.0	1.

Figure AII-11. Small-event coda averages 31-42°



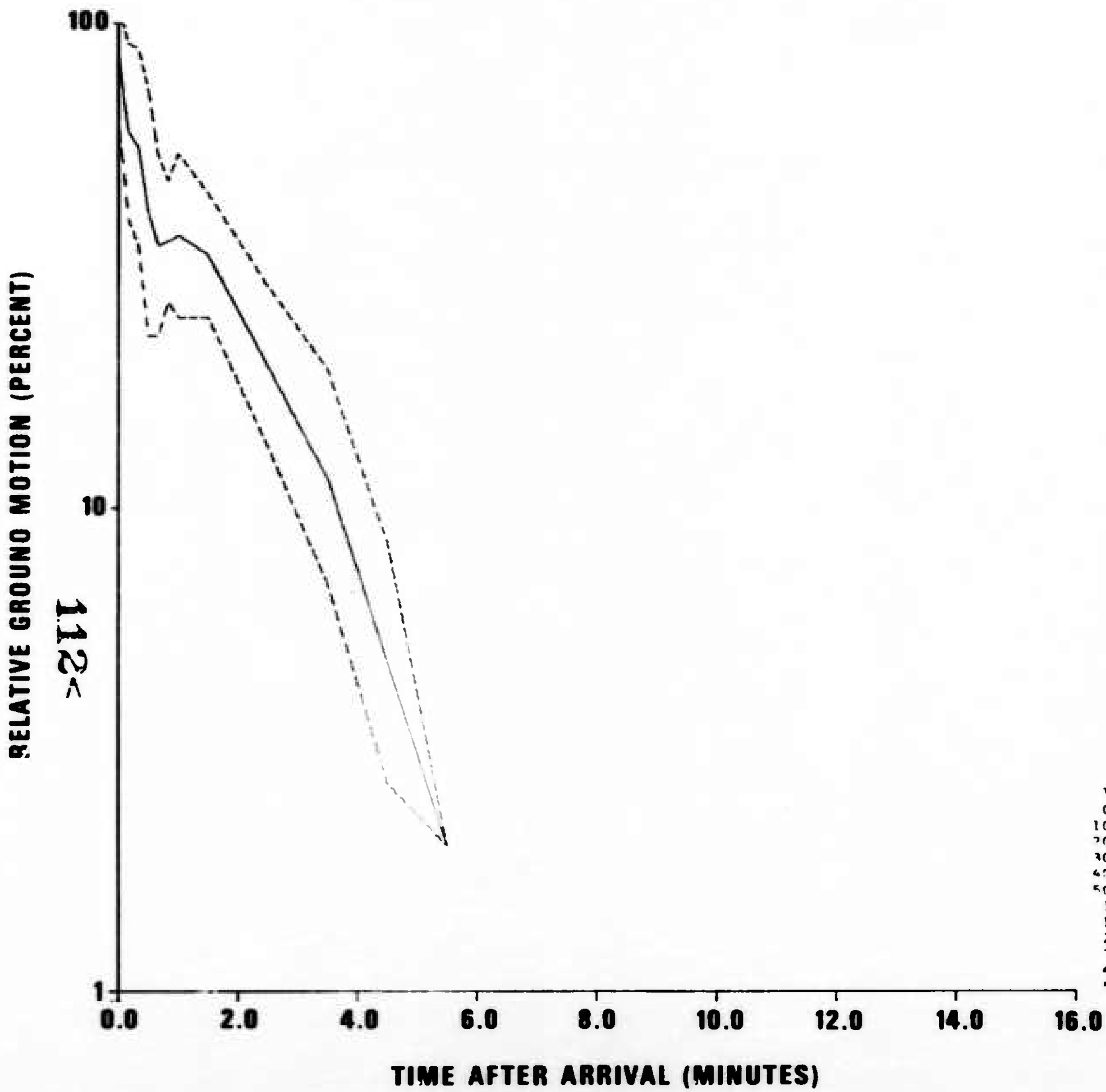
TIME		AVG	STD DEV	OBS
0.0	S	78.	0.15	44.
10.0	S	57.	0.22	44.
20.0	S	62.	0.20	44.
30.0	S	44.	0.22	44.
40.0	S	38.	0.23	44.
50.0	S	34.	0.19	44.
1.0	M	30.	0.21	44.
1.5	M	35.	0.24	44.
2.5	M	25.	0.25	38.
3.5	M	16.	0.28	31.
4.5	M	11.	0.33	15.
5.5	M	13.	0.31	10.
6.5	M	14.	0.30	8.
7.5	M	14.	0.23	5.
8.5	[illegible]	7.	0.[illegible]5	2.

Figure AII-12. Small-event coda averages 42-53°



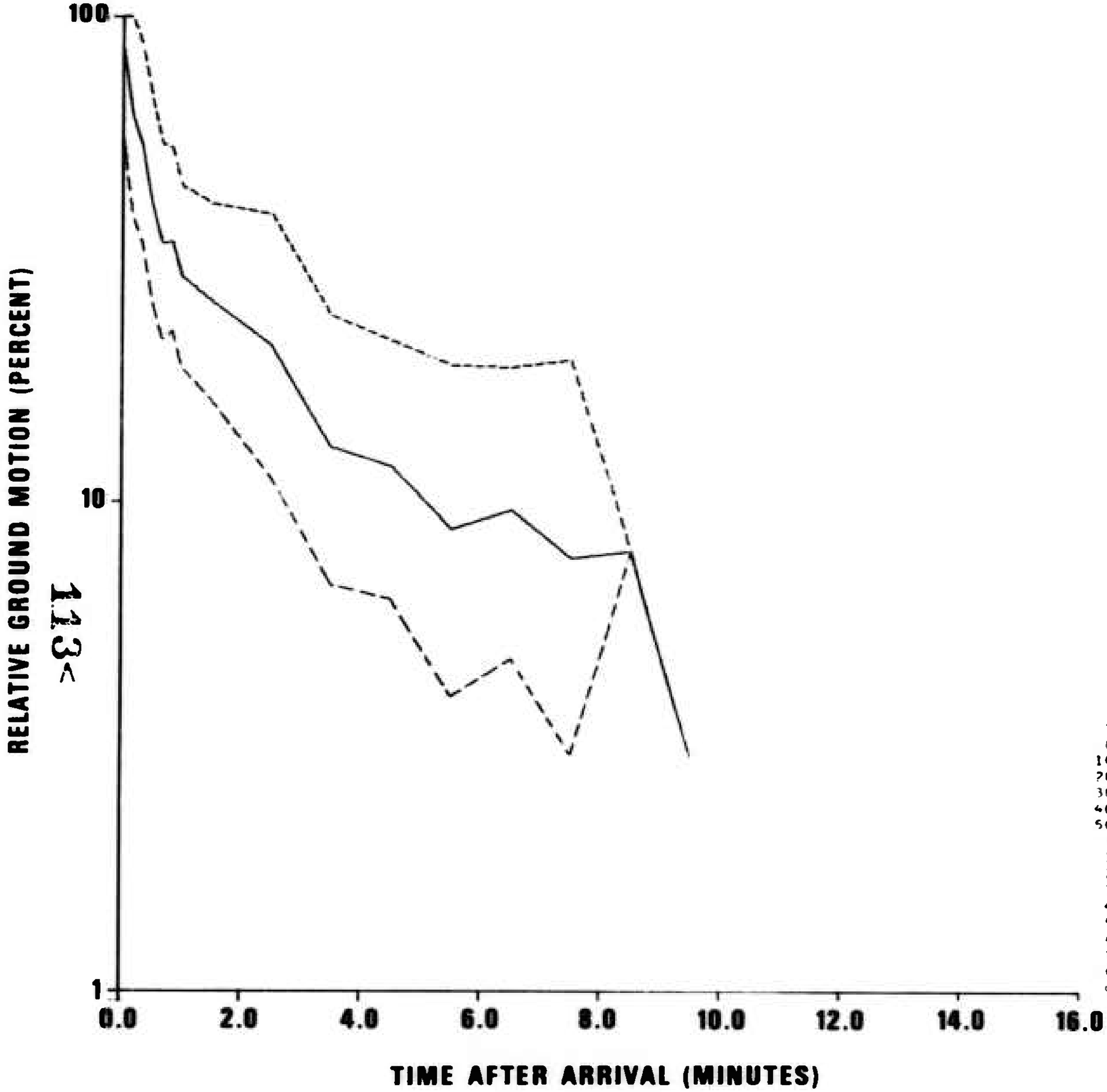
TIME		AVG	STD DEV	OBS
0.0	S	90.	0.11	11.
10.0	S	57.	0.22	11.
20.0	S	48.	0.18	11.
30.0	S	41.	0.23	11.
40.0	S	34.	0.24	11.
50.0	S	30.	0.19	11.
1.0	M	31.	0.18	11.
1.5	M	27.	0.18	11.
2.5	M	18.	0.27	8.
3.5	M	13.	0.32	7.
4.5	M	16.	0.25	4.
5.5	M	13.	0.37	3.
6.5	M	11.	0.67	2.
7.5	M	26.	0.04	2.
8.5	M	10.	0.0	1.
9.5	M	8.	0.0	1.
10.5	M	4.	0.0	1.

Figure AII-13. Small-event coda averages 53-56°



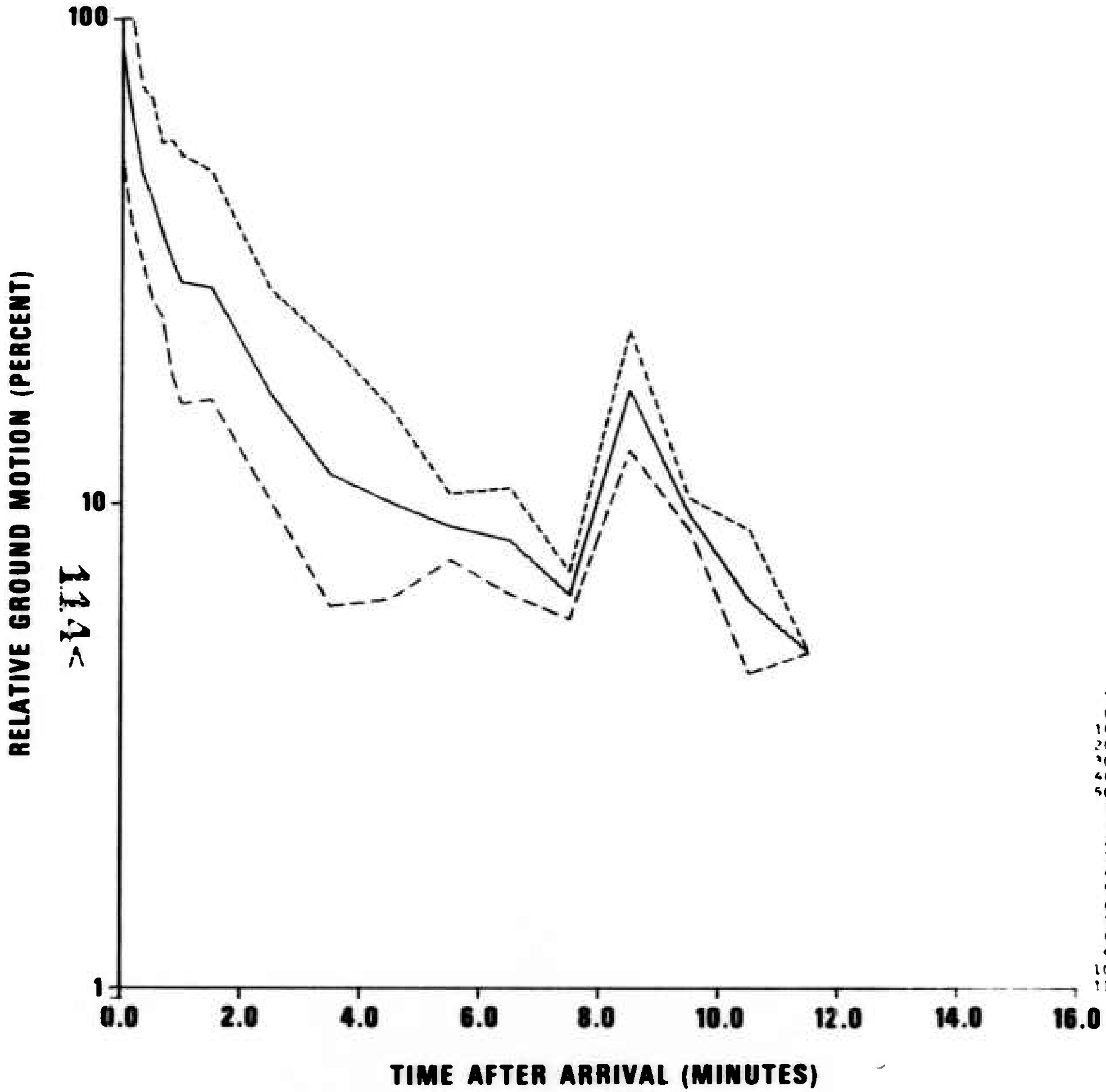
TIME	AVG	STD DEV	OBS
0.0 S	87.	0.11	11.
10.0 S	60.	0.18	11.
20.0 S	56.	0.20	11.
30.0 S	41.	0.26	11.
40.0 S	35.	0.19	11.
50.0 S	36.	0.13	11.
1.0 M	37.	0.17	11.
1.5 M	34.	0.13	11.
2.5 M	20.	0.16	11.
3.5 M	12.	0.22	7.
4.5 M	5.	0.25	3.
5.5 M	3.	0.0	1.

Figure AII-14. Small-event coda averages 56-59°



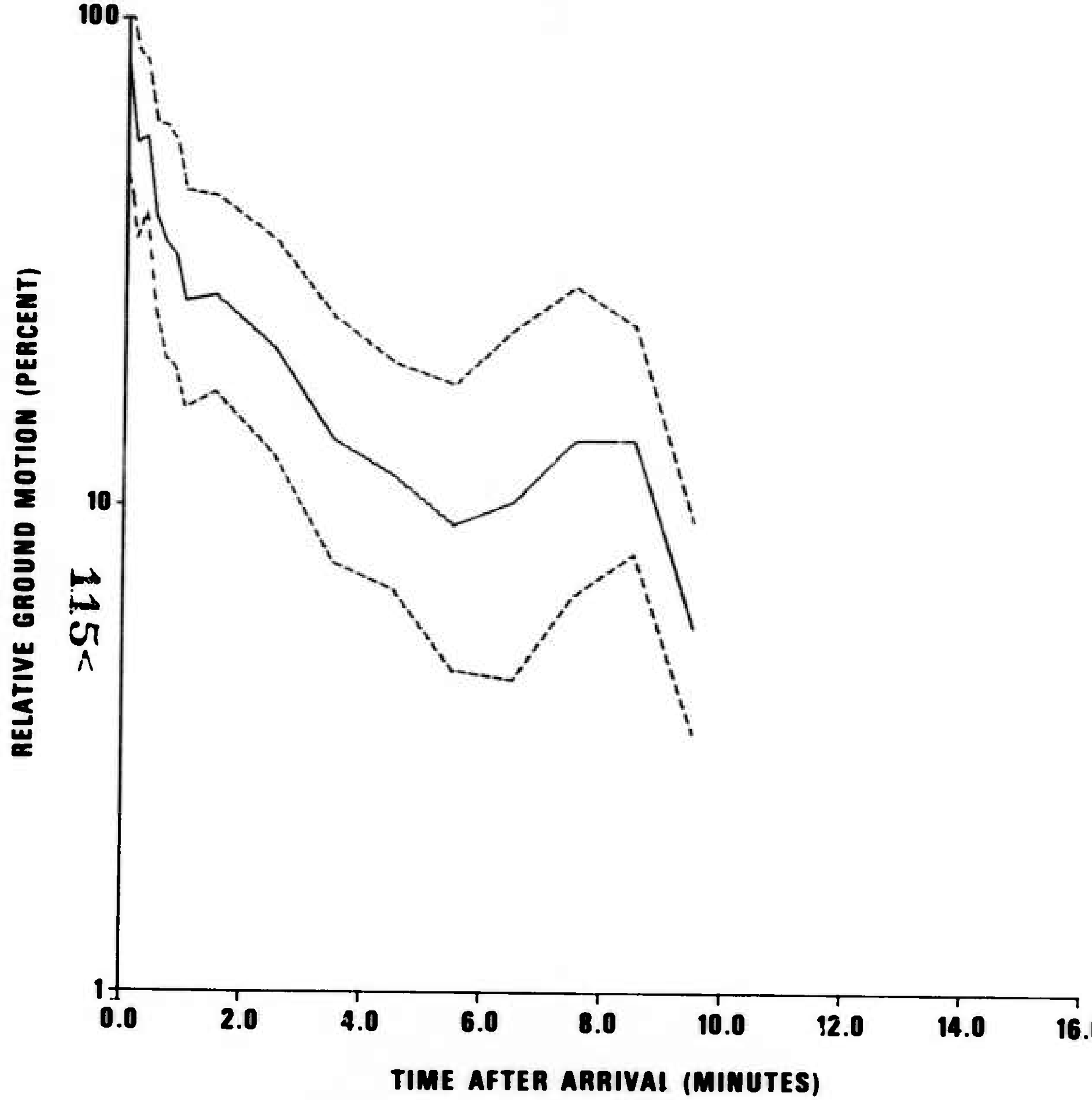
TIME		AVG	STD DEV	OBS
0.0	S	87.	0.12	25.
10.0	S	63.	0.20	25.
20.0	S	55.	0.20	25.
30.0	S	42.	0.21	25.
40.0	S	35.	0.20	25.
50.0	S	35.	0.19	25.
1.0	M	30.	0.19	25.
1.5	M	27.	0.21	25.
2.5	M	22.	0.28	20.
3.5	M	13.	0.27	17.
4.5	M	12.	0.26	11.
5.5	M	9.	0.34	6.
6.5	M	10.	0.30	4.
7.5	M	8.	0.41	2.
8.5	M	9.	0.0	1.
9.5	M	4.	0.0	1.

Figure AII-15. Small-event coda averages 59-63°



TIME		AVG	STD DEV	OBS
0.0	S	88.	0.14	14.
10.0	S	63.	0.21	14.
20.0	S	49.	0.18	14.
30.0	S	43.	0.20	14.
40.0	S	37.	0.18	14.
50.0	S	33.	0.24	14.
1.0	M	29.	0.26	14.
1.5	M	29.	0.23	14.
2.5	M	17.	0.22	11.
3.5	M	12.	0.27	7.
4.5	M	11.	0.20	3.
5.5	M	9.	0.07	2.
6.5	M	9.	0.11	2.
7.5	M	7.	0.05	2.
8.5	M	18.	0.12	2.
9.5	M	10.	0.03	2.
10.5	M	7.	0.14	2.
11.5	M	6.	0.0	1.

Figure AII-16. Small-event coda averages 63-67°



TIME	AVG	STD DEV	OBS
0.0 S	83.	0.16	21.
10.0 S	56.	0.20	21.
20.0 S	58.	0.16	21.
30.0 S	40.	0.19	21.
40.0 S	35.	0.24	21.
50.0 S	33.	0.23	21.
1.0 M	27.	0.22	21.
1.5 M	28.	0.20	21.
2.5 M	22.	0.22	20.
3.5 M	14.	0.26	17.
4.5 M	12.	0.23	12.
5.5 M	10.	0.29	9.
6.5 M	11.	0.36	5.
7.5 M	14.	0.32	4.
8.5 M	14.	0.24	4.
9.5 M	6.	0.21	2.

Figure AII-17. Small-event coda averages 67-72°

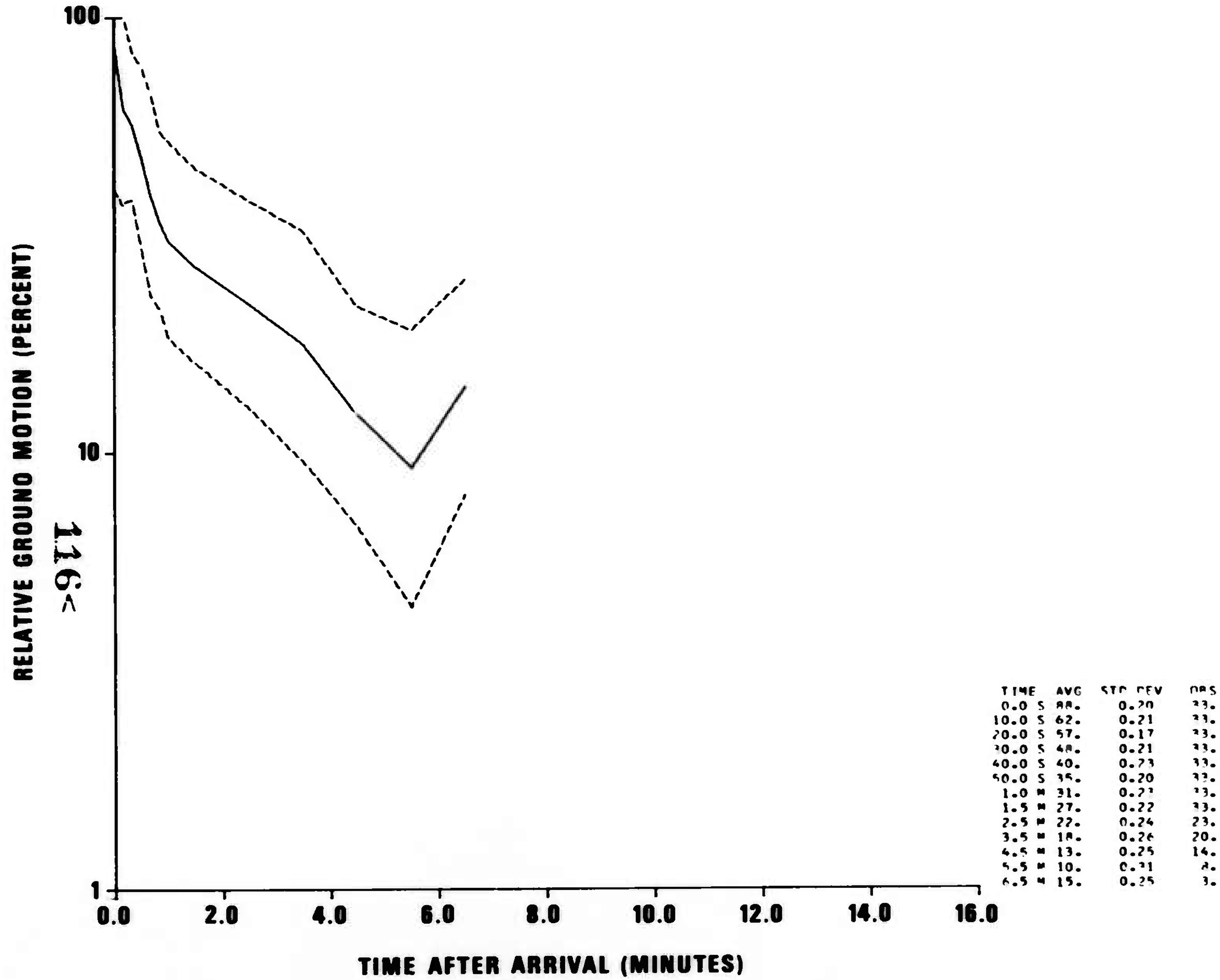
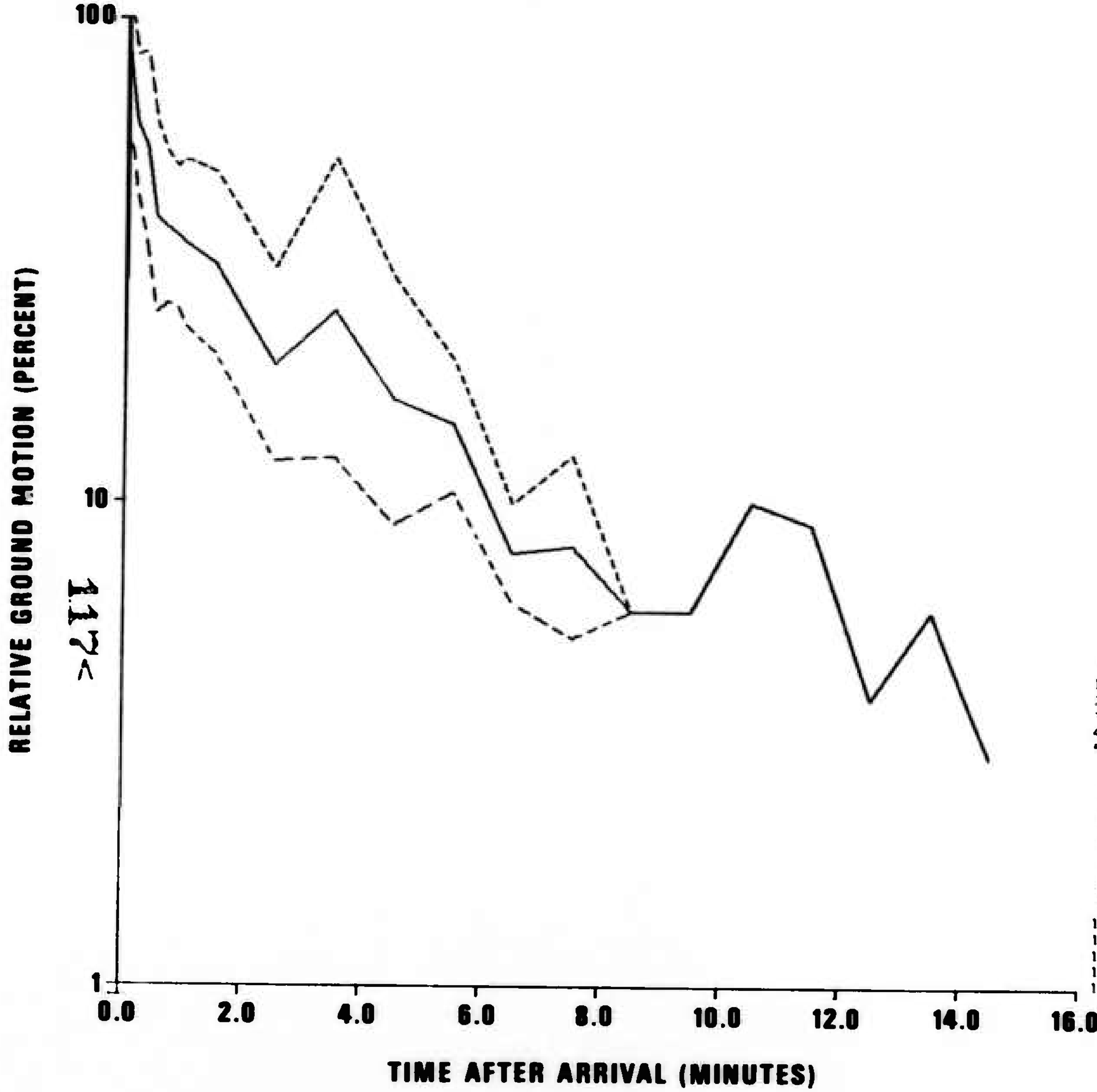


Figure AII-18. Small-event coda averages 72-79°



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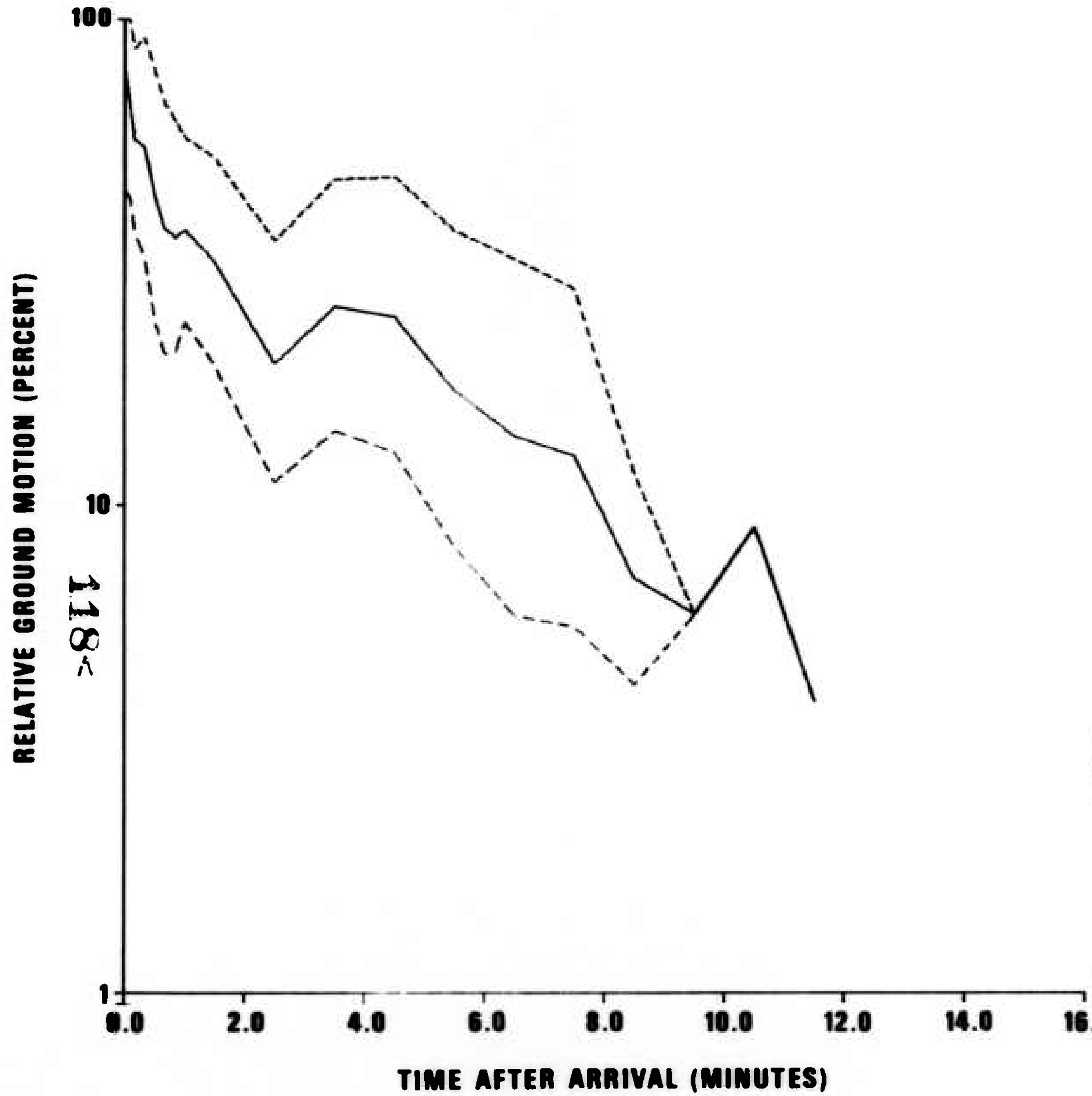
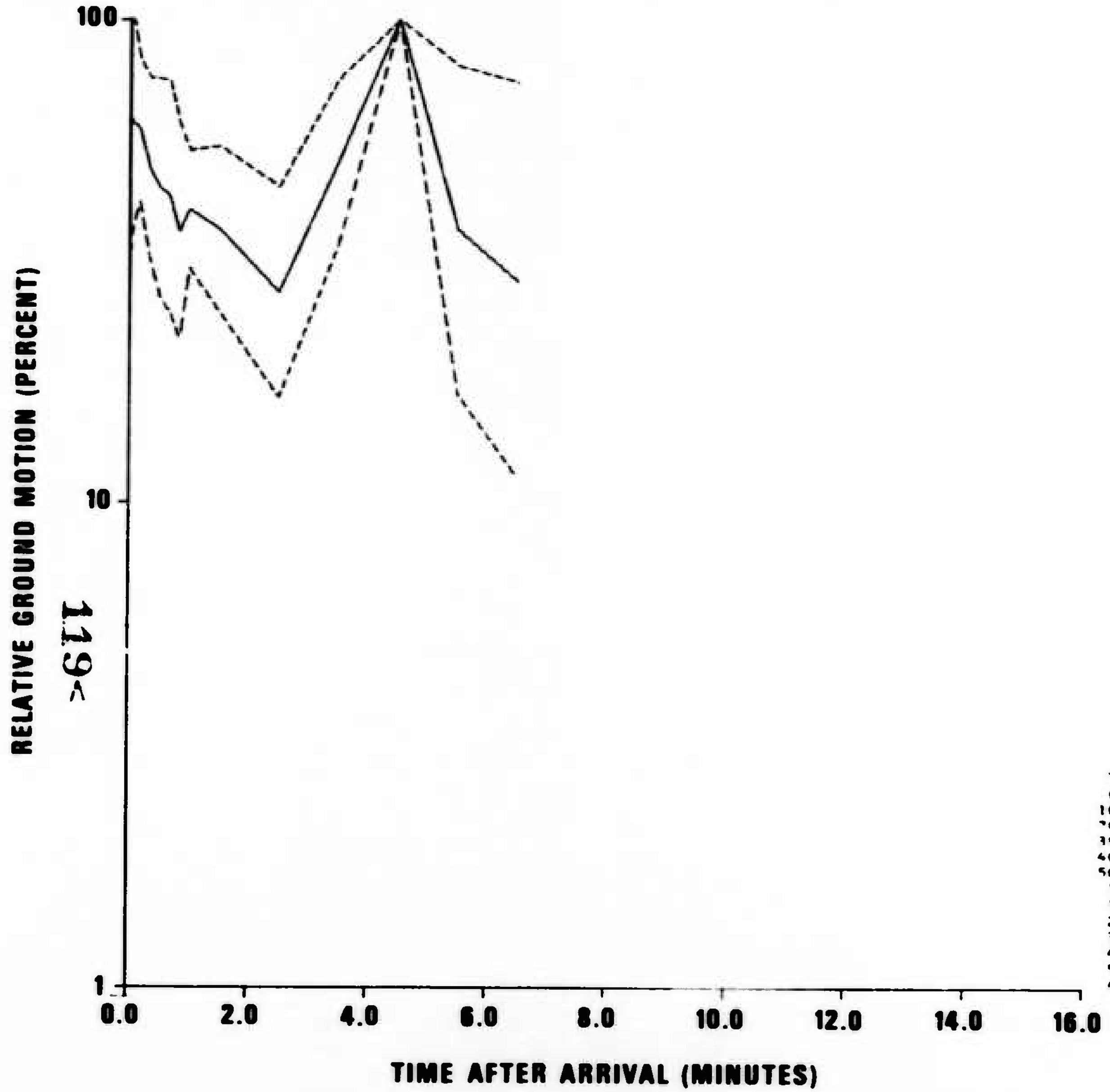
TIME	AVG	STD DEV	OBS
0.0 S	90.	0.13	22.
10.0 S	61.	0.14	22.
20.0 S	55.	0.20	22.
30.0 S	39.	0.19	22.
40.0 S	38.	0.16	22.
50.0 S	36.	0.14	22.
1.0 M	35.	0.17	22.
1.5 M	32.	0.19	22.
2.5 M	20.	0.20	18.
3.5 M	26.	0.31	11.
4.5 M	17.	0.26	10.
5.5 M	15.	0.14	8.
6.5 M	8.	0.10	3.
7.5 M	9.	0.19	2.
8.5 M	7.	0.0	1.
9.5 M	7.	0.0	1.
10.5 M	11.	0.0	1.
11.5 M	10.	0.0	1.
12.5 M	5.	0.0	1.
13.5 M	7.	0.0	1.
14.5 M	4.	0.0	1.

Figure AII-19. Small-event coda averages 79-84°



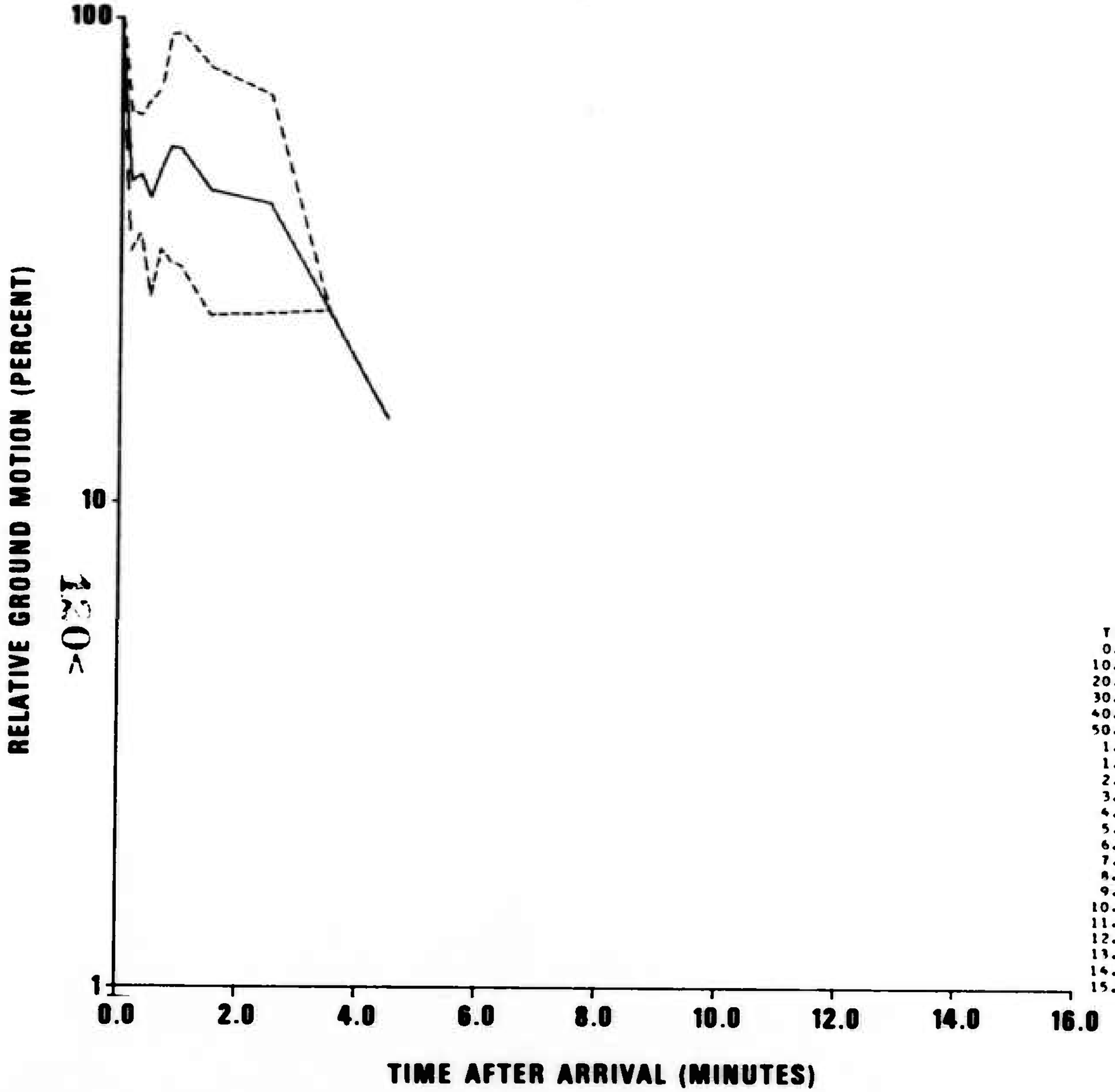
TIME		AVG	STD DEV	OBS
0.0	S	79.	0.19	32.
10.0	S	57.	0.19	32.
20.0	S	55.	0.22	32.
30.0	S	44.	0.25	32.
40.0	S	38.	0.25	32.
50.0	S	36.	0.24	32.
1.0	M	38.	0.19	32.
1.5	M	32.	0.21	32.
2.5	M	20.	0.25	28.
3.5	M	26.	0.26	22.
4.5	M	25.	0.28	15.
5.5	M	18.	0.33	13.
6.5	M	14.	0.37	7.
7.5	M	13.	0.35	3.
8.5	M	8.	0.21	2.
9.5	M	7.	0.0	1.
10.5	M	10.	0.0	1.
11.5	M	5.	0.0	1.

Figure AII-20. Small-event coda averages 84-98°



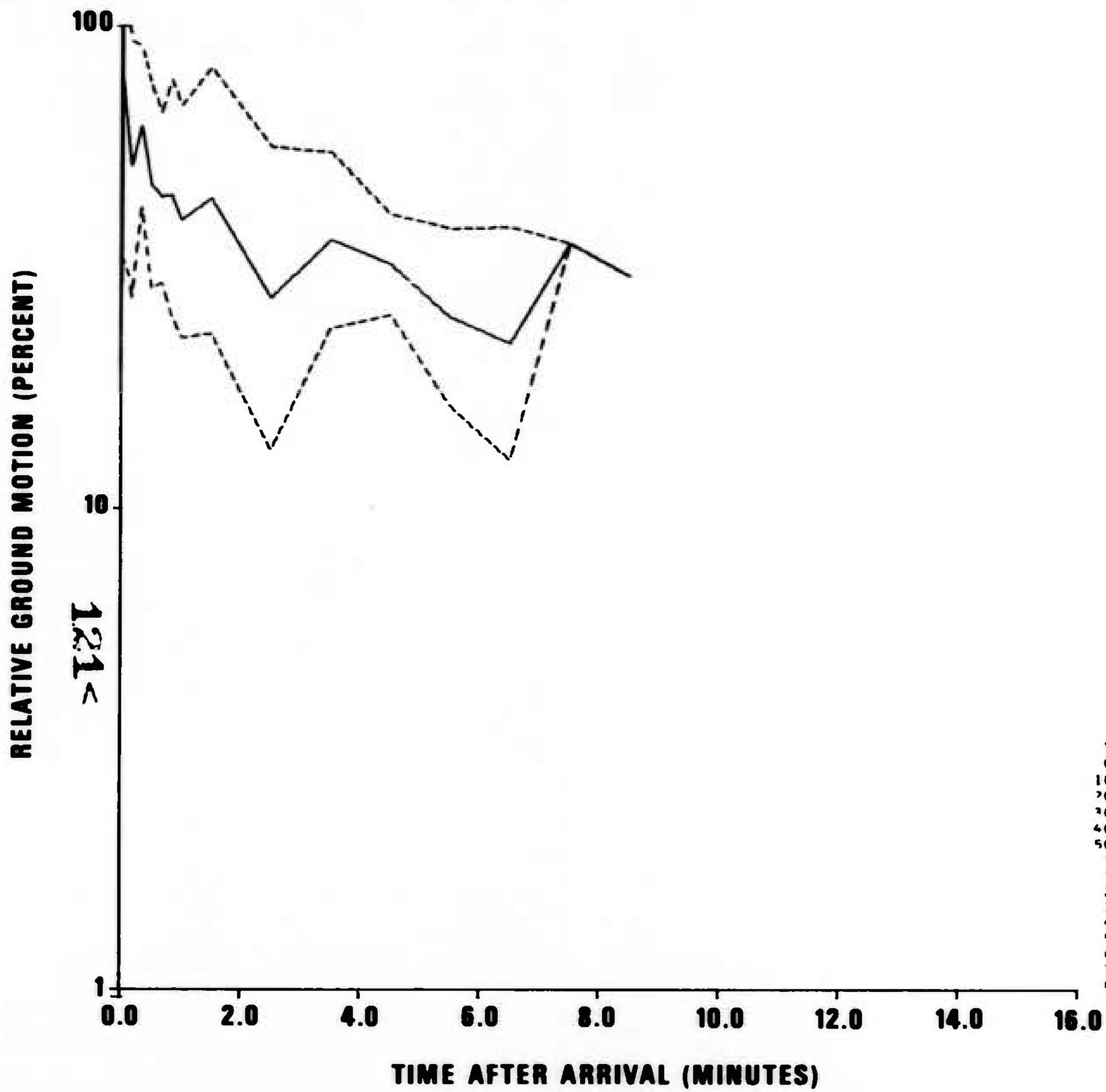
TIME	AVG	STD DEV	OBS
0.0 S	62.	0.24	6.
10.0 S	59.	0.15	6.
20.0 S	50.	0.19	6.
30.0 S	45.	0.22	6.
40.0 S	44.	0.24	6.
50.0 S	37.	0.22	6.
1.0 M	41.	0.12	6.
1.5 M	37.	0.17	6.
2.5 M	28.	0.22	4.
3.5 M	51.	0.17	4.
4.5 M	100.	0.0	3.
5.5 M	37.	0.24	3.
6.5 M	29.	0.41	3.

Figure AII-21. Small-event coda averages 98-103°



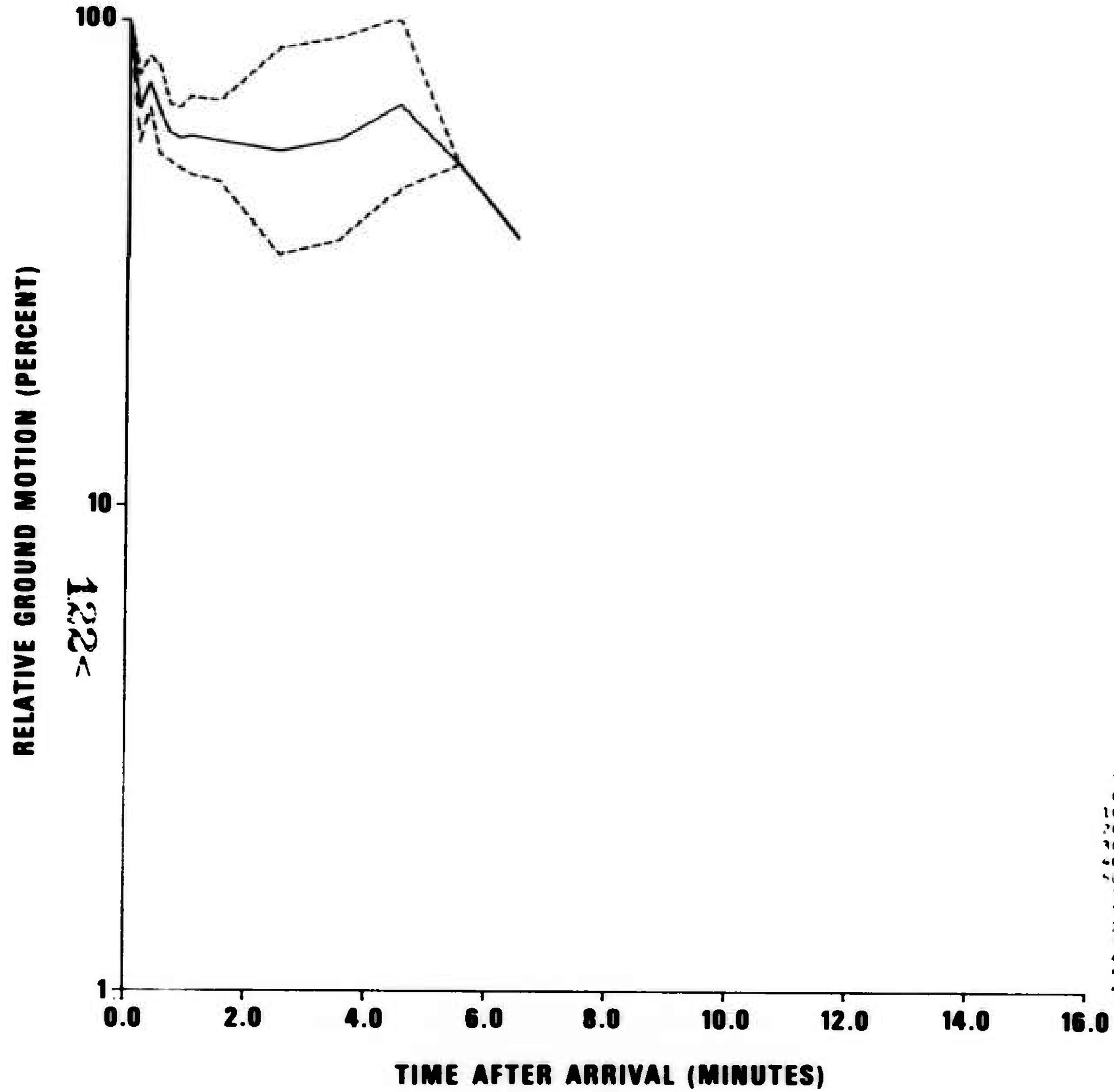
TIME		AVG	STD DEV	OBS
0.0	S	38.	0.14	8.
10.0	S	42.	0.19	8.
20.0	S	41.	0.14	8.
30.0	S	40.	0.18	8.
40.0	S	42.	0.21	8.
50.0	S	54.	0.19	8.
1.0	M	69.	0.18	8.
1.5	M	80.	0.25	8.
2.5	M	59.	0.21	8.
3.5	M	54.	0.11	8.
4.5	M	49.	0.17	8.
5.5	M	47.	0.24	8.
6.5	M	38.	0.26	8.
7.5	M	33.	0.18	8.
8.5	M	33.	0.18	7.
9.5	M	31.	0.24	7.
10.5	M	33.	0.14	6.
11.5	M	41.	0.25	5.
12.5	M	33.	0.12	5.
13.5	M	32.	0.15	5.
14.5	M	25.	0.13	5.
15.5	M	29.	0.12	5.

Figure AII-22. Small-event coda averages 110-115°



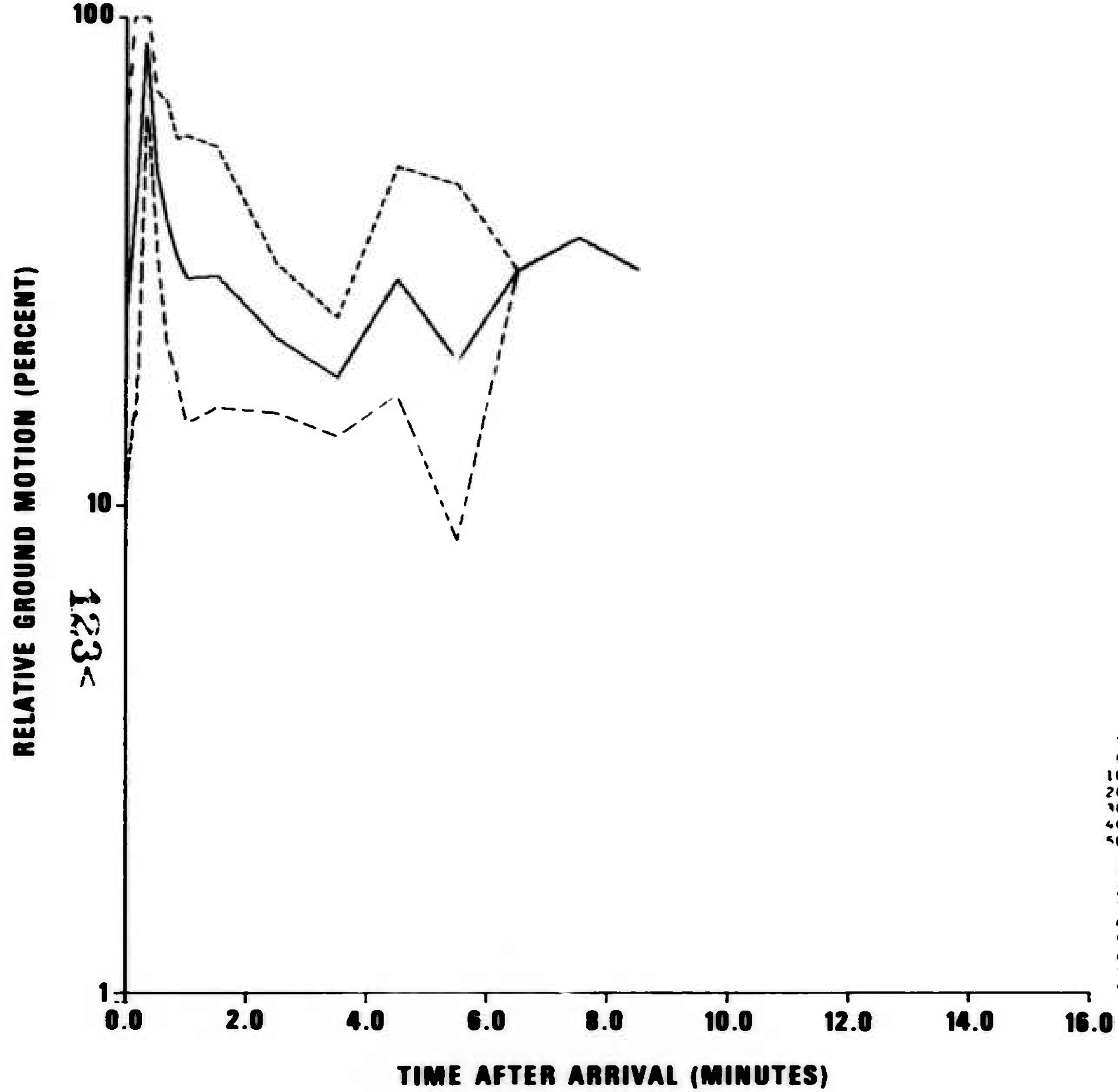
TIME		AVG	STD DEV	OBS
0.0	S	80.	0.24	11.
10.0	S	51.	0.27	11.
20.0	S	62.	0.17	11.
30.0	S	47.	0.21	11.
40.0	S	44.	0.18	11.
50.0	S	44.	0.24	11.
1.0	M	40.	0.24	11.
1.5	M	44.	0.28	11.
2.5	M	28.	0.31	9.
3.5	M	36.	0.18	4.
4.5	M	32.	0.10	3.
5.5	M	25.	0.18	3.
6.5	M	22.	0.24	3.
7.5	M	36.	0.0	1.
8.5	M	31.	0.0	1.

Figure AII-23. Small-event coda averages 118-127°



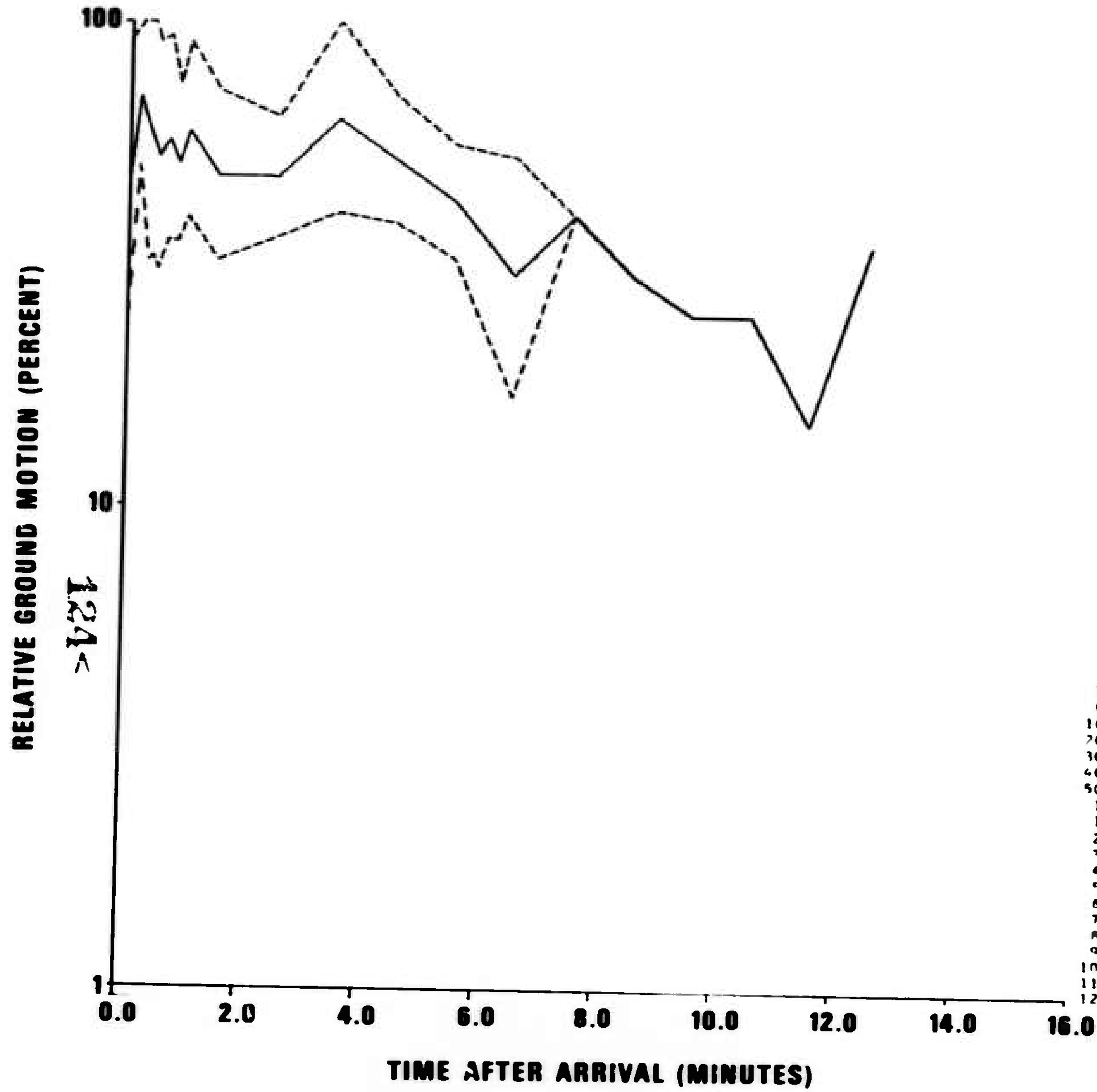
TIME		AVG	STD DEV	OBS
0.0	S	100.	0.0	4.
10.0	S	66.	0.07	4.
20.0	S	75.	0.05	4.
30.0	S	66.	0.09	4.
40.0	S	59.	0.06	4.
50.0	S	57.	0.07	4.
1.0	M	58.	0.09	4.
1.5	M	56.	0.09	4.
2.5	M	54.	0.22	3.
3.5	M	57.	0.21	2.
4.5	M	68.	0.19	2.
5.5	M	51.	0.0	2.
6.5	M	36.	0.0	1.

Figure AII-24. Small-event coda averages 127-136°



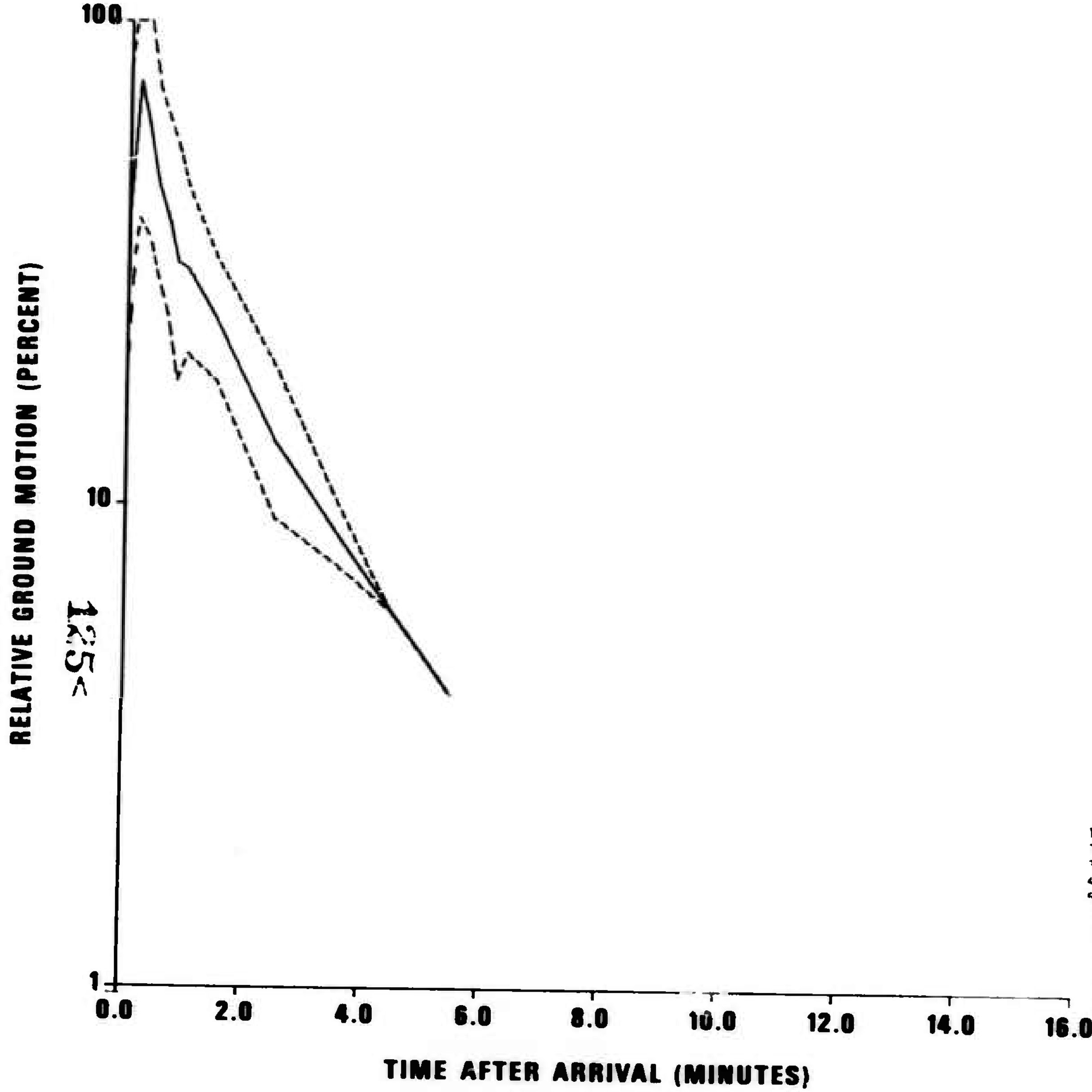
TIME	AVG	STD DEV	OBS
0.0 S	26.	0.38	4.
10.0 S	43.	0.41	4.
20.0 S	90.	0.10	4.
30.0 S	49.	0.16	4.
40.0 S	38.	0.25	4.
50.0 S	33.	0.24	4.
1.0 M	29.	0.30	4.
1.5 M	30.	0.27	4.
2.5 M	22.	0.15	3.
3.5 M	19.	0.12	3.
4.5 M	29.	0.23	3.
5.5 M	20.	0.36	3.
6.5 M	31.	0.0	1.
7.5 M	36.	0.0	1.
8.5 M	31.	0.0	1.

Figure AII-25. Small-event coda averages 136-140°



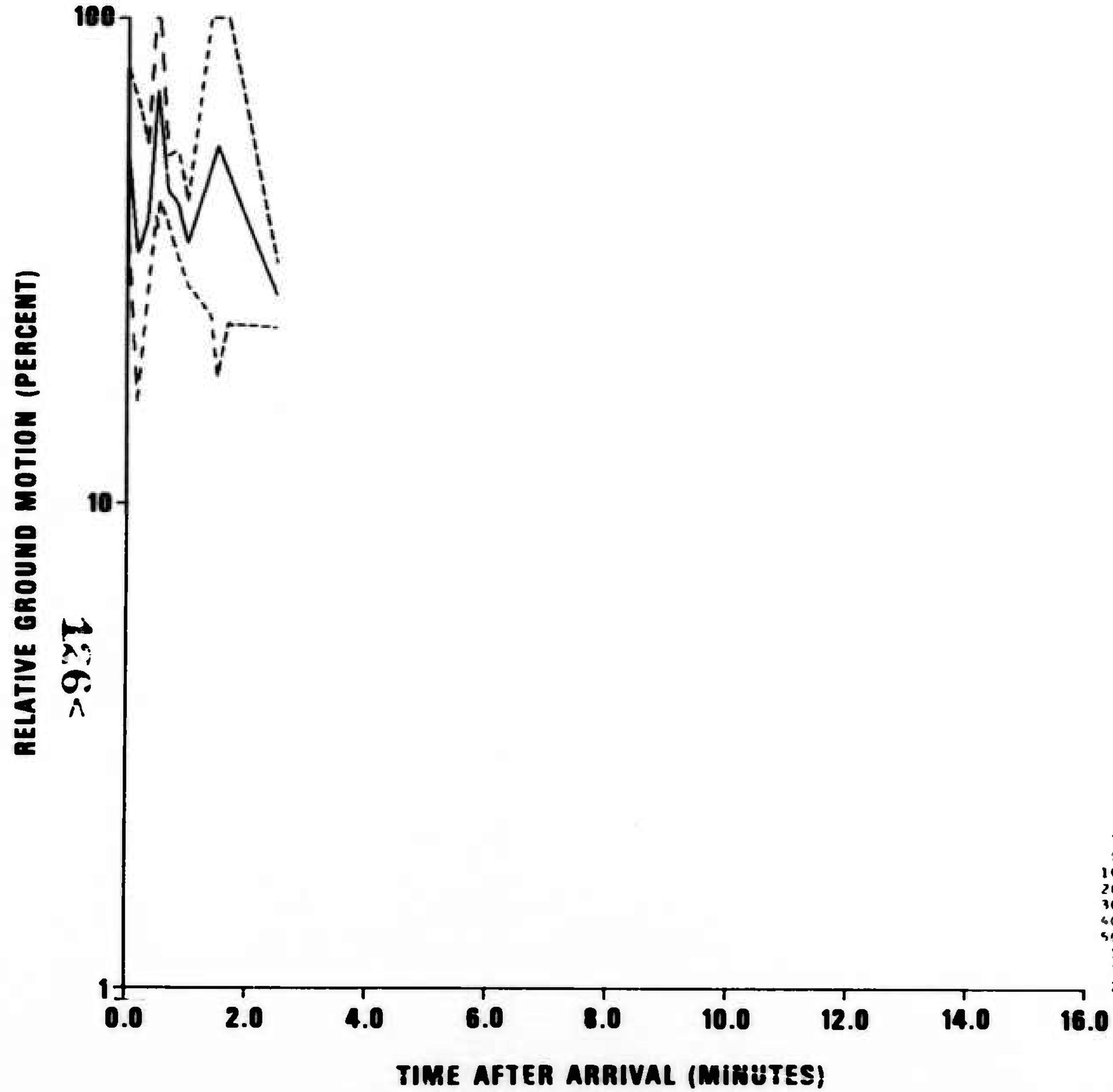
TIME	AVG	STD DEV	OBS
0.0 S	48.	0.29	4.
10.0 S	71.	0.14	4.
20.0 S	61.	0.25	4.
30.0 S	53.	0.24	4.
40.0 S	58.	0.21	4.
50.0 S	52.	0.17	4.
1.0 M	60.	0.18	4.
1.5 M	49.	0.18	4.
2.5 M	48.	0.13	3.
3.5 M	64.	0.20	3.
4.5 M	53.	0.13	2.
5.5 M	43.	0.12	2.
6.5 M	31.	0.25	2.
7.5 M	41.	0.0	1.
8.5 M	31.	0.0	1.
9.5 M	26.	0.0	1.
10.5 M	26.	0.0	1.
11.5 M	16.	0.0	1.
12.5 M	36.	0.0	1.

Figure AII-26. Small-event coda averages 140-145°



TIME	AVG	STD DEV	OBS
0.0 S	40.	0.30	6.
10.0 S	76.	0.20	6.
20.0 S	61.	0.22	6.
30.0 S	46.	0.20	6.
40.0 S	40.	0.21	6.
50.0 S	32.	0.24	6.
1.0 M	31.	0.17	6.
1.5 M	24.	0.13	6.
2.5 M	14.	0.16	3.
3.5 M	9.	0.07	2.
4.5 M	7.	0.0	1.
5.5 M	5.	0.0	1.

Figure AII-27. Small-event coda averages 145-155°



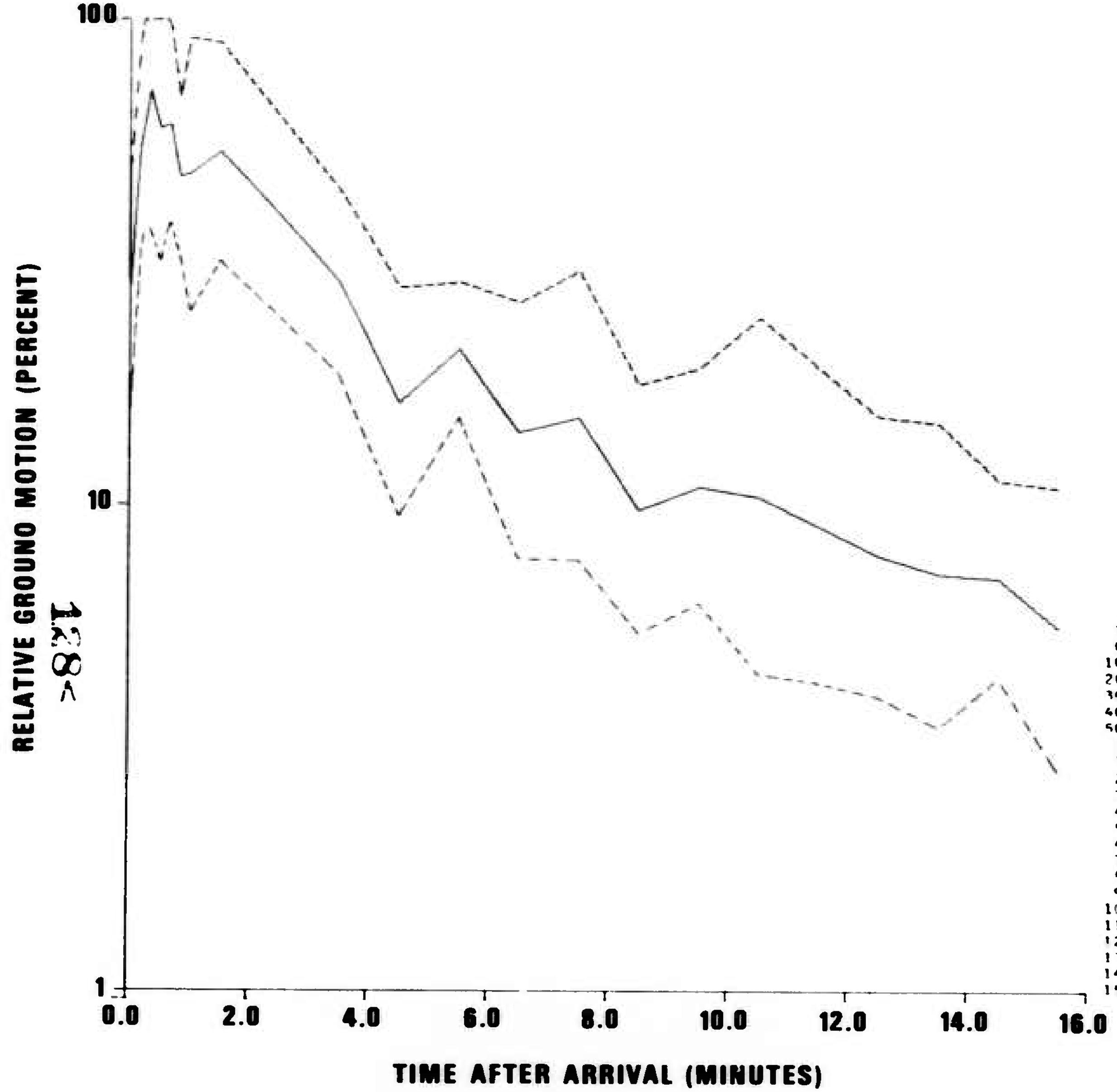
TIME	AVG	STD DEV	OBS
0.0 S	53.	0.17	2.
10.0 S	34.	0.31	2.
20.0 S	39.	0.16	2.
30.0 S	71.	0.21	2.
40.0 S	45.	0.07	2.
50.0 S	42.	0.11	2.
1.0 M	35.	0.09	2.
1.5 M	55.	0.37	2.
2.5 M	27.	0.07	2.

Figure AII-28. Small-event coda averages 155-166°

APPENDIX III

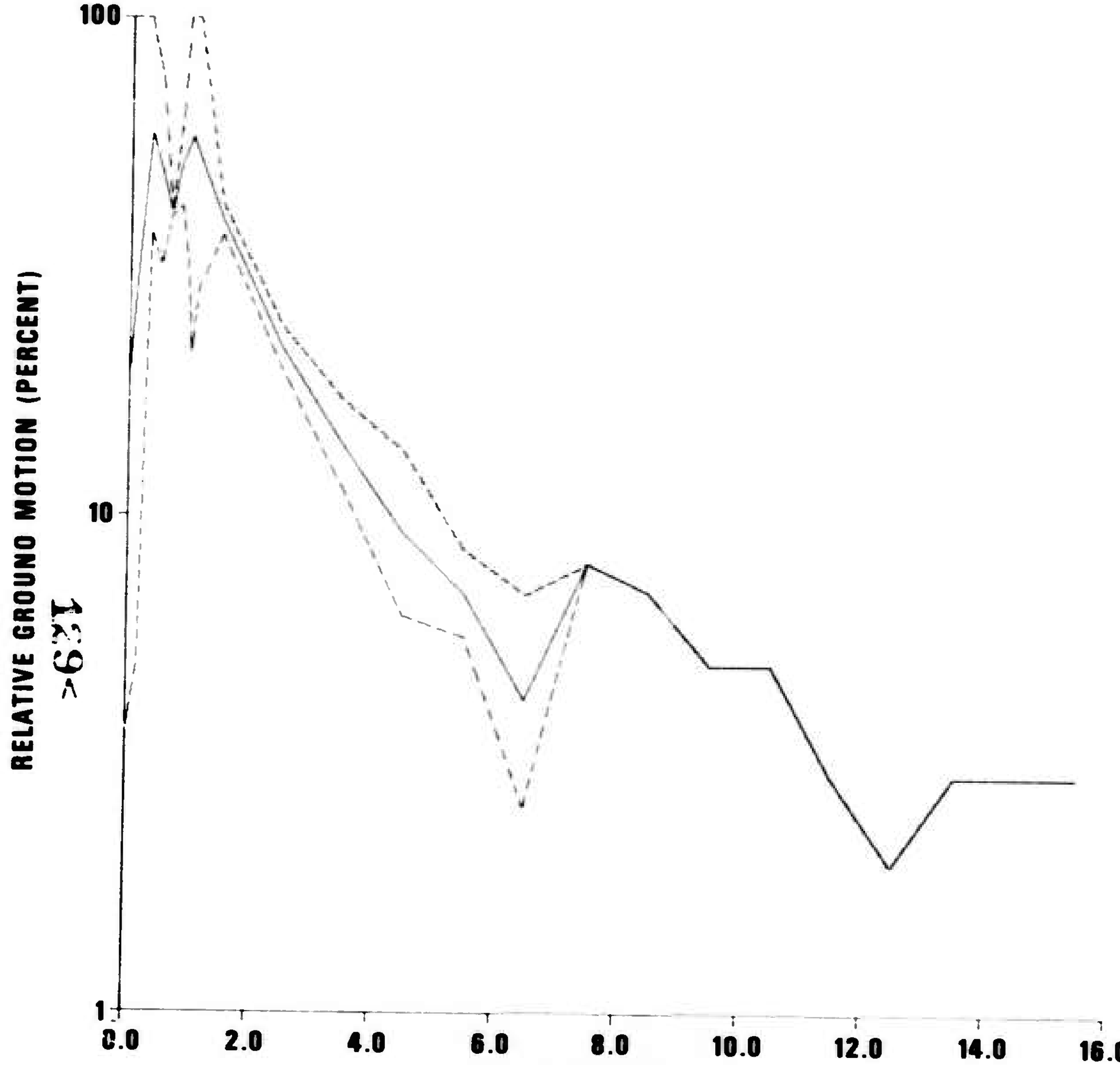
Large-event coda averages; dashed lines indicate ± one standard deviation of the individual coda observations.

1. 42-53°
2. 53-56°
3. 56-59°
4. 59-63°
5. 63-67°
6. 67-72°
7. 72-79°
8. 79-84°
9. 84-98°
10. 98-103°
11. 103-105°
12. 105-110°
13. 110-115°
14. 115-118°
15. 118-127°
16. 127-136°
17. 136-140°
18. 140-145°
19. 145-155°
20. 155-166°



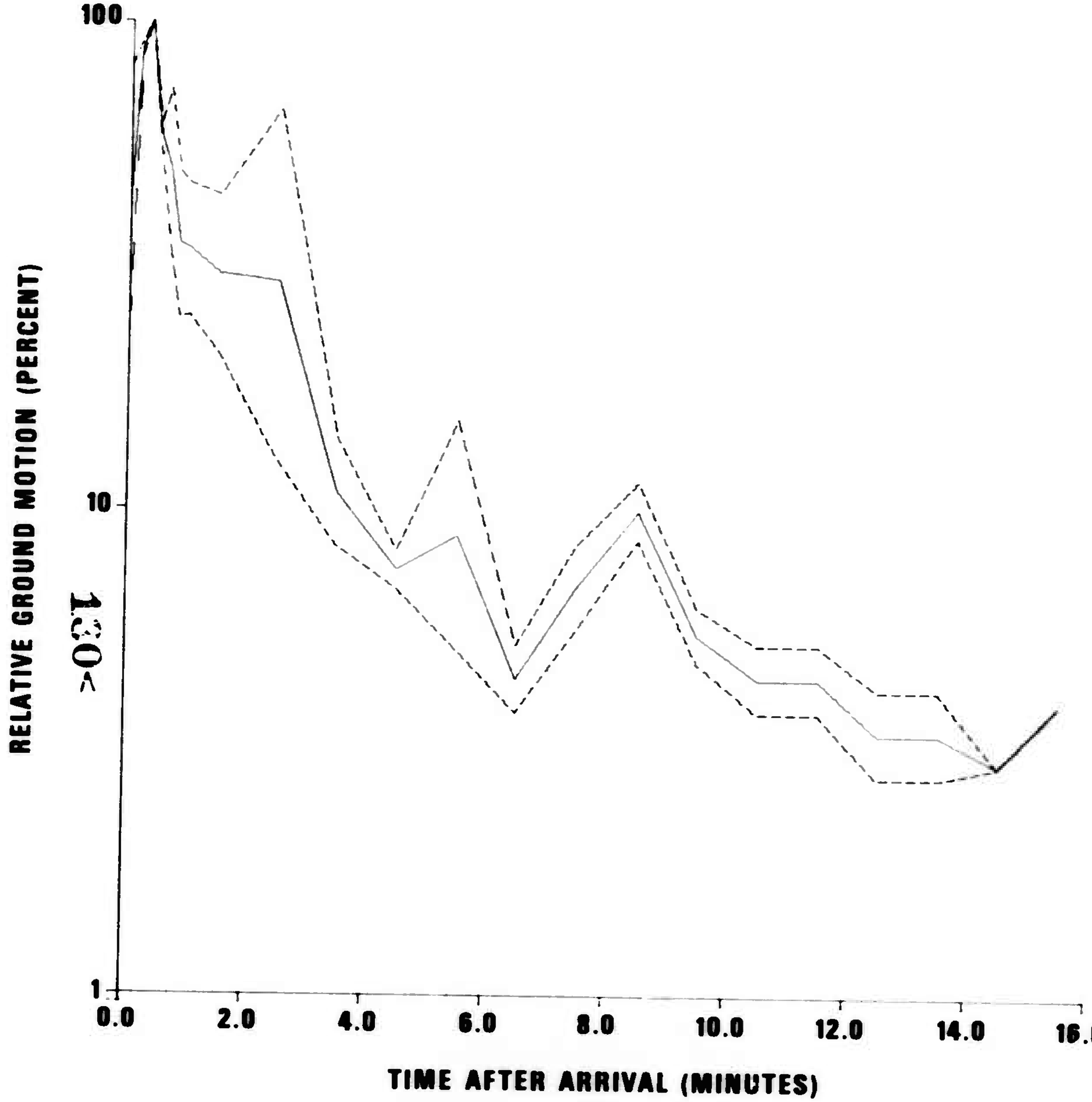
TIME		AVG	STD DEV	OBS
0.0	S	28.	0.25	9.
10.0	S	55.	0.22	9.
20.0	S	72.	0.22	9.
30.0	S	60.	0.25	9.
40.0	S	51.	0.21	9.
50.0	S	47.	0.17	9.
1.0	M	49.	0.29	9.
1.5	M	53.	0.23	9.
2.5	M	39.	0.21	9.
3.5	M	29.	0.19	9.
4.5	M	17.	0.21	9.
5.5	M	21.	0.14	9.
6.5	M	15.	0.26	8.
7.5	M	16.	0.30	8.
8.5	M	10.	0.26	8.
9.5	M	11.	0.24	8.
10.5	M	11.	0.27	9.
11.5	M	10.	0.32	9.
12.5	M	9.	0.29	9.
13.5	M	8.	0.31	9.
14.5	M	8.	0.20	9.
15.5	M	6.	0.20	9.

Figure AIII-1. Large-event coda averages 42-53°



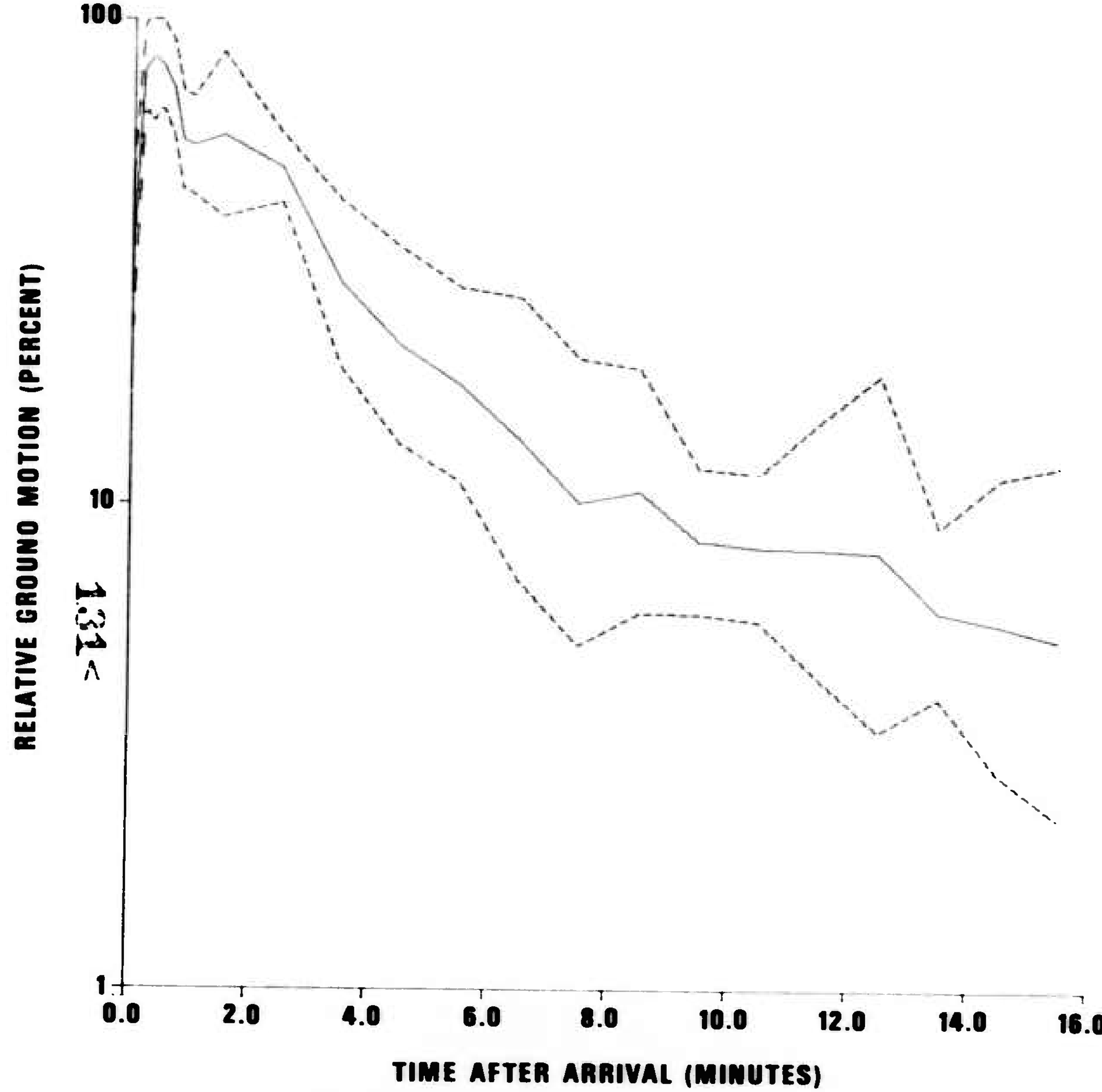
TIME	AVG	STD DEV	[illegible]
0.0 S	20.	0.[illegible]	2.
10.0 S	35.	0.65	2.
20.0 S	55.	0.21	2.
30.0 S	50.	0.1[illegible]	2.
40.0 S	41.	0.[illegible]1	2.
50.0 S	51.	0.[illegible]	2.
1.0 M	58.	0.34	2.
1.5 M	35.	0.[illegible]	2.
2.5 M	22.	0.04	2.
3.5 M	14.	0.[illegible]	2.
4.5 M	10.	0.17	2.
5.5 M	7.	0.09	2.
6.5 M	5.	0.21	2.
7.5 M	[illegible]	0.[illegible]	1.
8.5 M	[illegible]	0.[illegible]	1.
9.5 M	[illegible]	0.[illegible]	1.
10.5 M	[illegible]	0.[illegible]	1.
11.5 M	4.	0.[illegible]	1.
12.5 M	[illegible]	0.[illegible]	1.
13.5 M	4.	0.[illegible]	1.
14.5 M	4.	0.[illegible]	1.
15.5 M	4.	0.[illegible]	1.

Figure AIII-2. Large-event coda averages 53-56°



TIME		AVG	STD DEV	OBS
0.0	S	44.	[illegible]	2.
10.0	S	88.	0.01	2.
20.0	S	101.	0.0	2.
30.0	S	59.	[illegible]	2.
40.0	S	50.	0.16	2.
50.0	S	35.	0.15	2.
1.0	M	34.	0.14	2.
1.5	M	30.	0.16	2.
2.5	M	25.	0.26	2.
3.5	M	11.	0.11	2.
4.5	M	8.	0.04	2.
5.5	M	9.	0.24	2.
6.5	M	5.	0.07	2.
7.5	M	7.	0.09	2.
8.5	M	10.	[illegible]	2.
9.5	M	6.	0.26	2.
10.5	M	5.	[illegible]	2.
11.5	M	5.	0.07	2.
12.5	M	4.	0.09	2.
13.5	M	4.	[illegible]	2.
14.5	M	4.	0.0	2.
15.5	M	[illegible]	[illegible]	2.

Figure AIII-3. Large-event coda averages 56-59°



TIME		AVG	STD DEV	OBS
0.0	S	33.	0.17	4.
10.0	S	75.	0.29	4.
20.0	S	84.	0.13	4.
30.0	S	80.	0.09	4.
40.0	S	73.	0.13	4.
50.0	S	57.	0.10	4.
1.0	M	55.	0.10	4.
1.5	M	58.	0.17	4.
2.5	M	50.	0.27	4.
3.5	M	29.	0.17	4.
4.5	M	22.	0.20	4.
5.5	M	19.	0.20	4.
6.5	M	14.	0.29	4.
7.5	M	11.	0.33	4.
8.5	M	11.	0.25	4.
9.5	M	9.	0.15	4.
10.5	M	5.	0.15	4.
11.5	M	5.	0.27	3.
12.5	M	5.	0.37	3.
13.5	M	7.	0.19	3.
14.5	M	6.	0.30	3.
15.5	M	6.	0.26	3.

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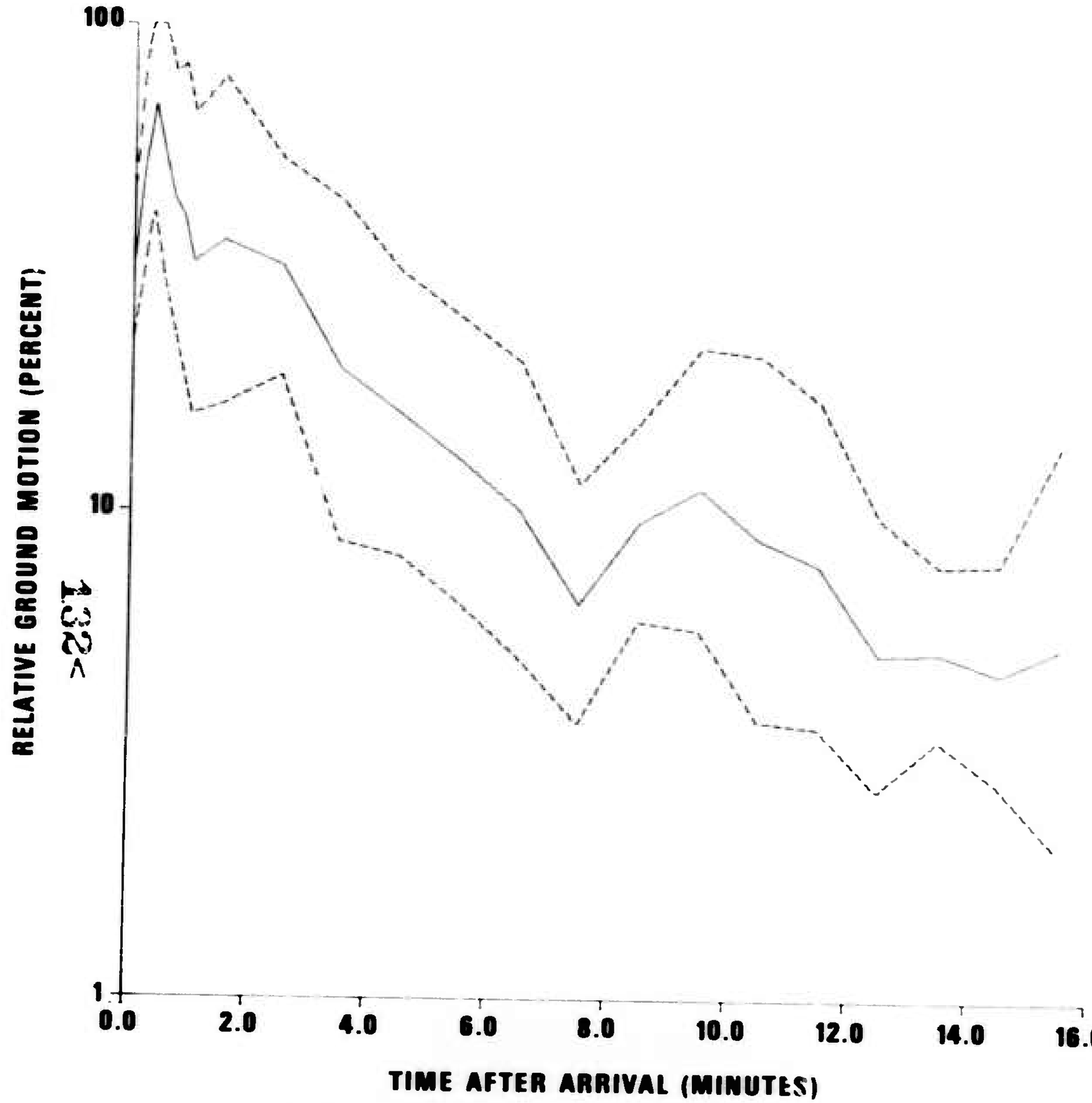
Figure AIII-4. Large-event coda averages 59-63°



TIME		AVG	STD DEV	OBS
0.0	S	32.	0.16	6.
10.0	S	51.	0.22	6.
20.0	S	65.	0.19	6.
30.0	S	55.	0.26	6.
40.0	S	44.	0.26	6.
50.0	S	41.	0.31	6.
1.0	M	33.	0.31	6.
1.5	M	36.	0.24	6.
2.5	M	32.	0.22	6.
3.5	M	20.	0.35	6.
4.5	M	16.	0.29	6.
5.5	M	13.	0.22	6.
6.5	M	11.	0.30	6.
7.5	M	7.	0.35	5.
8.5	M	10.	0.20	5.
9.5	M	12.	0.26	5.
10.5	M	5.	0.47	5.
11.5	M	8.	0.33	5.
12.5	M	6.	[illegible]	4.
13.5	M	6.	0.18	4.
14.5	M	5.	0.23	4.
15.5	M	6.	[illegible]	4.

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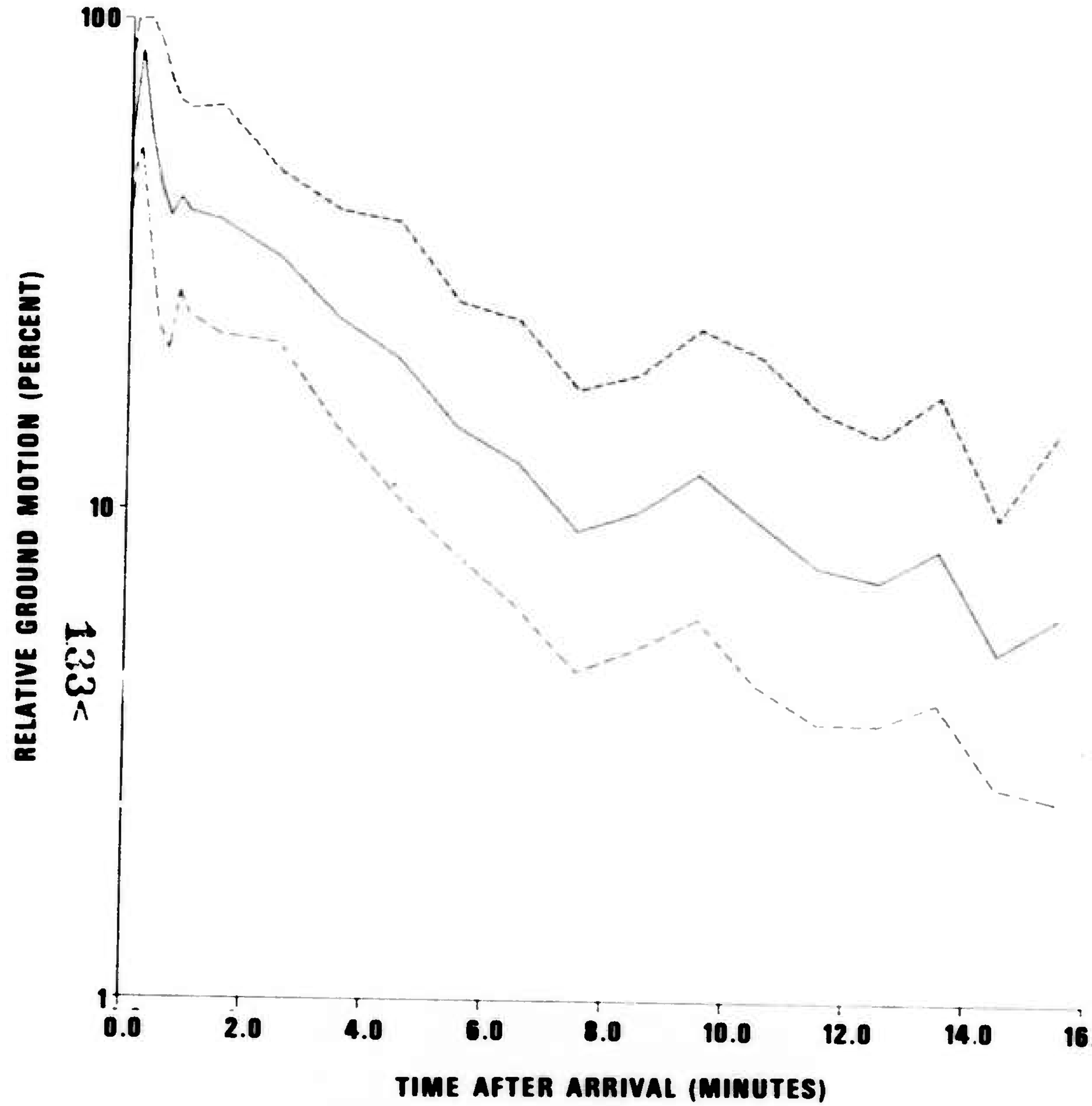
Figure AIII-5. Large-event coda averages 63-67°



TIME		AVG	STD DEV	CAS
0.0	S	55.	0.15	11.
10.0	S	87.	0.13	11.
20.0	S	60.	0.22	11.
30.0	S	46.	0.26	11.
40.0	S	40.	0.28	11.
50.0	S	44.	0.20	11.
1.0	M	41.	0.21	11.
1.5	M	40.	0.24	11.
2.5	M	33.	0.19	11.
3.5	M	25.	0.22	11.
4.5	M	21.	0.29	9.
5.5	M	15.	0.26	9.
6.5	M	13.	0.20	9.
7.5	M	10.	0.29	7.
8.5	M	10.	0.24	6.
9.5	M	12.	0.30	6.
10.5	M	10.	0.34	6.
11.5	M	9.	0.32	6.
12.5	M	8.	[illegible]	6.
13.5	M	6.	0.31	5.
14.5	M	6.	[illegible]	5.
15.5	M	[illegible]	[illegible]	5.

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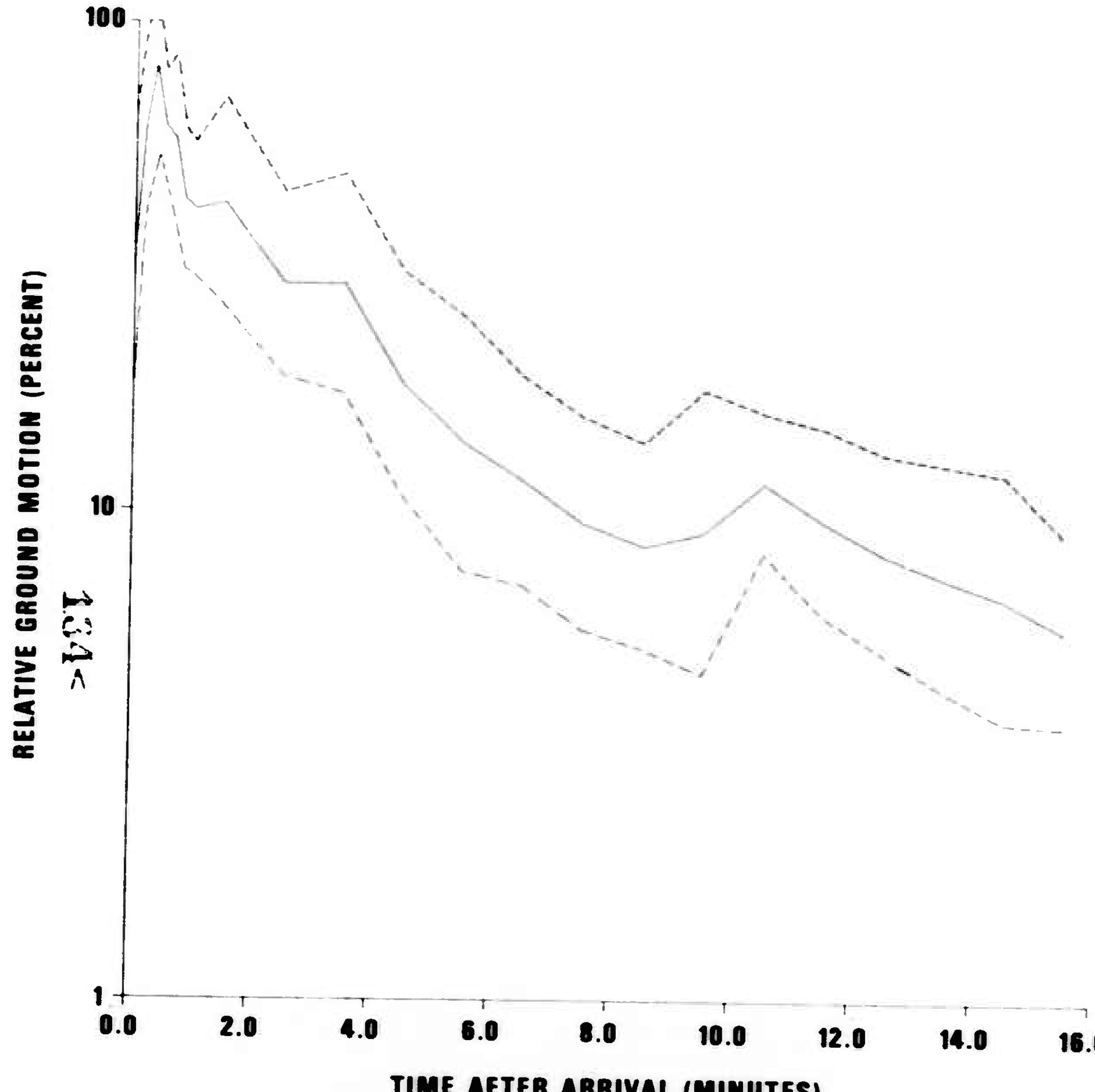
Figure AIII-6. Large-event coda averages 67-72°



TIME		AVG	STD DEV	OBS
0.0	S	35.	0.29	13.
10.0	S	63.	0.30	13.
20.0	S	82.	0.15	13.
30.0	S	62.	0.11	13.
40.0	S	59.	0.17	13.
50.0	S	44.	0.15	13.
1.0	M	42.	0.14	14.
1.5	M	43.	0.21	13.
2.5	M	30.	0.19	13.
3.5	M	30.	0.23	13.
4.5	M	19.	0.23	13.
5.5	M	14.	0.26	13.
6.5	M	12.	0.21	11.
7.5	M	10.	0.22	10.
8.5	M	9.	0.21	10.
9.5	M	10.	0.25	10.
10.5	M	12.	0.14	10.
11.5	M	10.	0.19	10.
12.5	M	9.	0.22	10.
13.5	M	8.	0.23	10.
14.5	M	7.	0.26	9.
15.5	M	6.	0.13	9.

Figure AIII-7. Large-event coda averages 72-79°

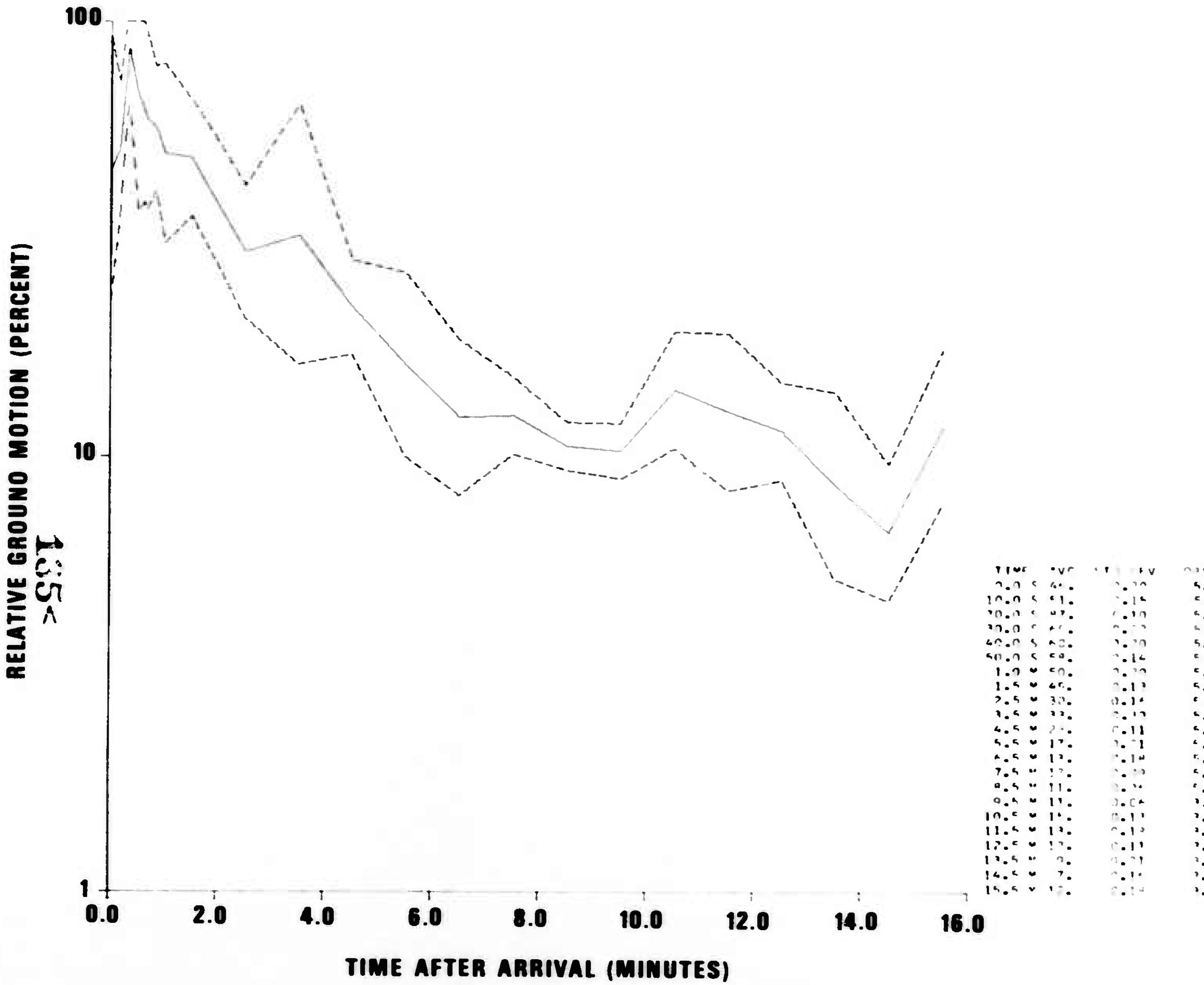


Figure AIII-8. Large-event coda averages 79-84°

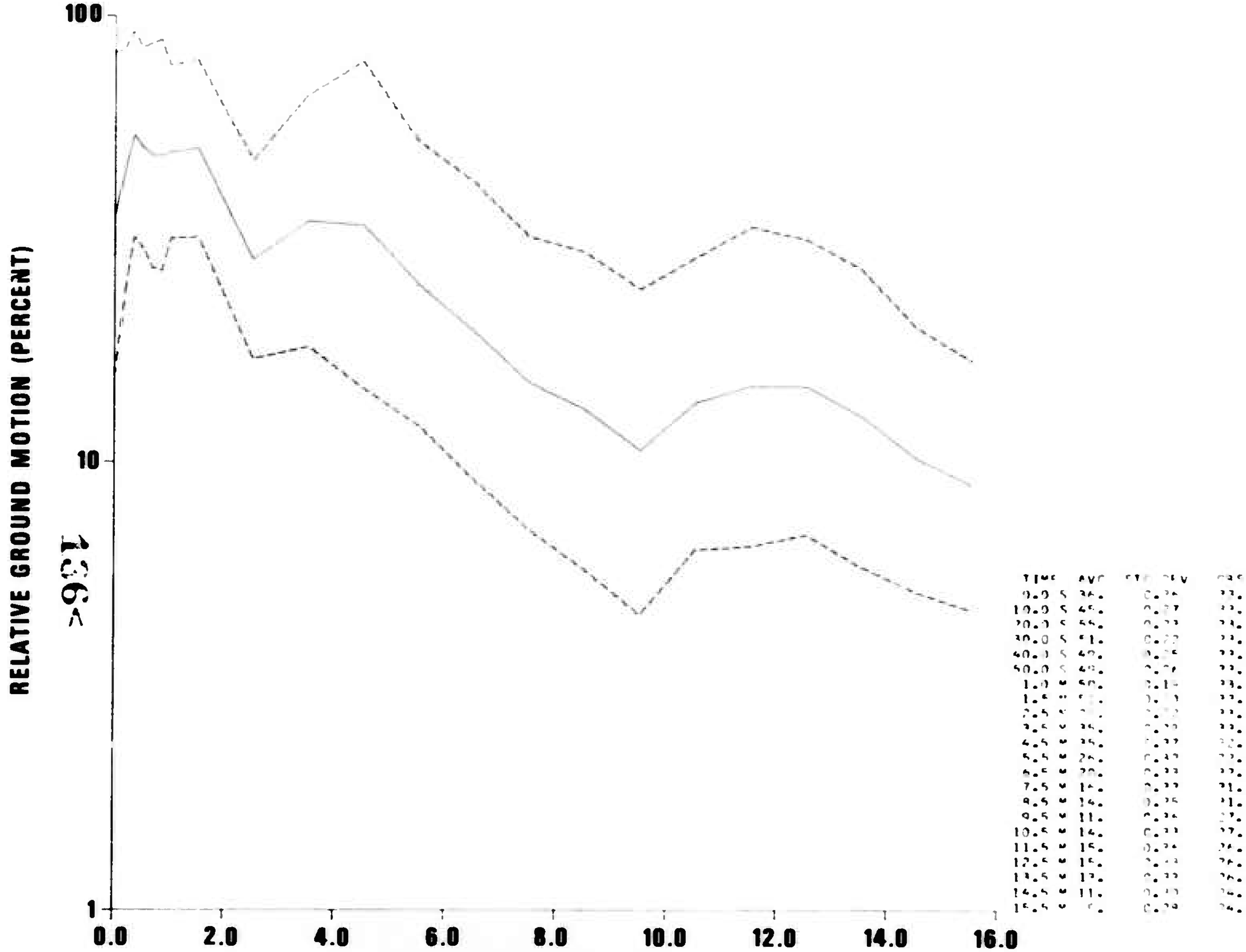
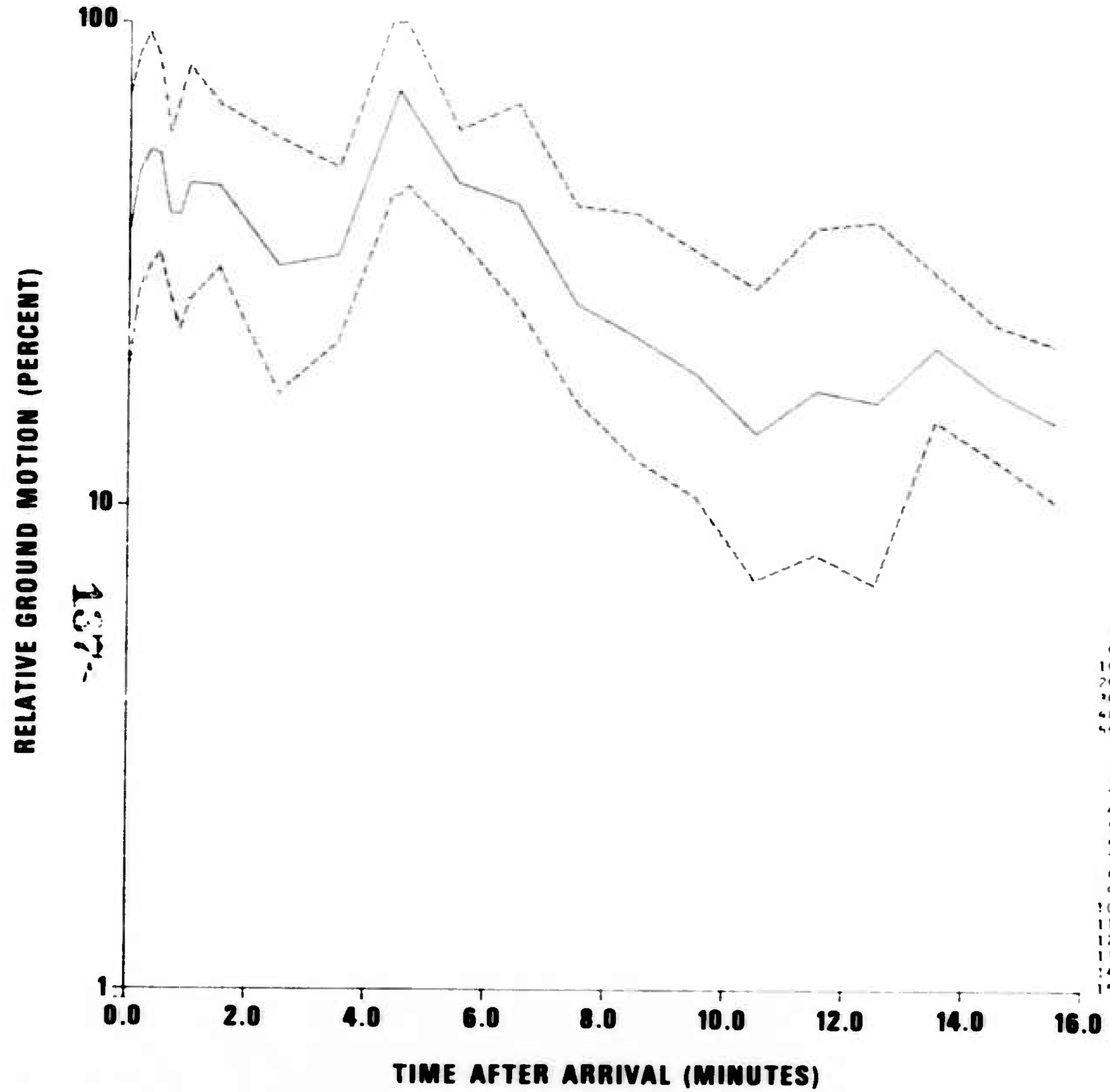
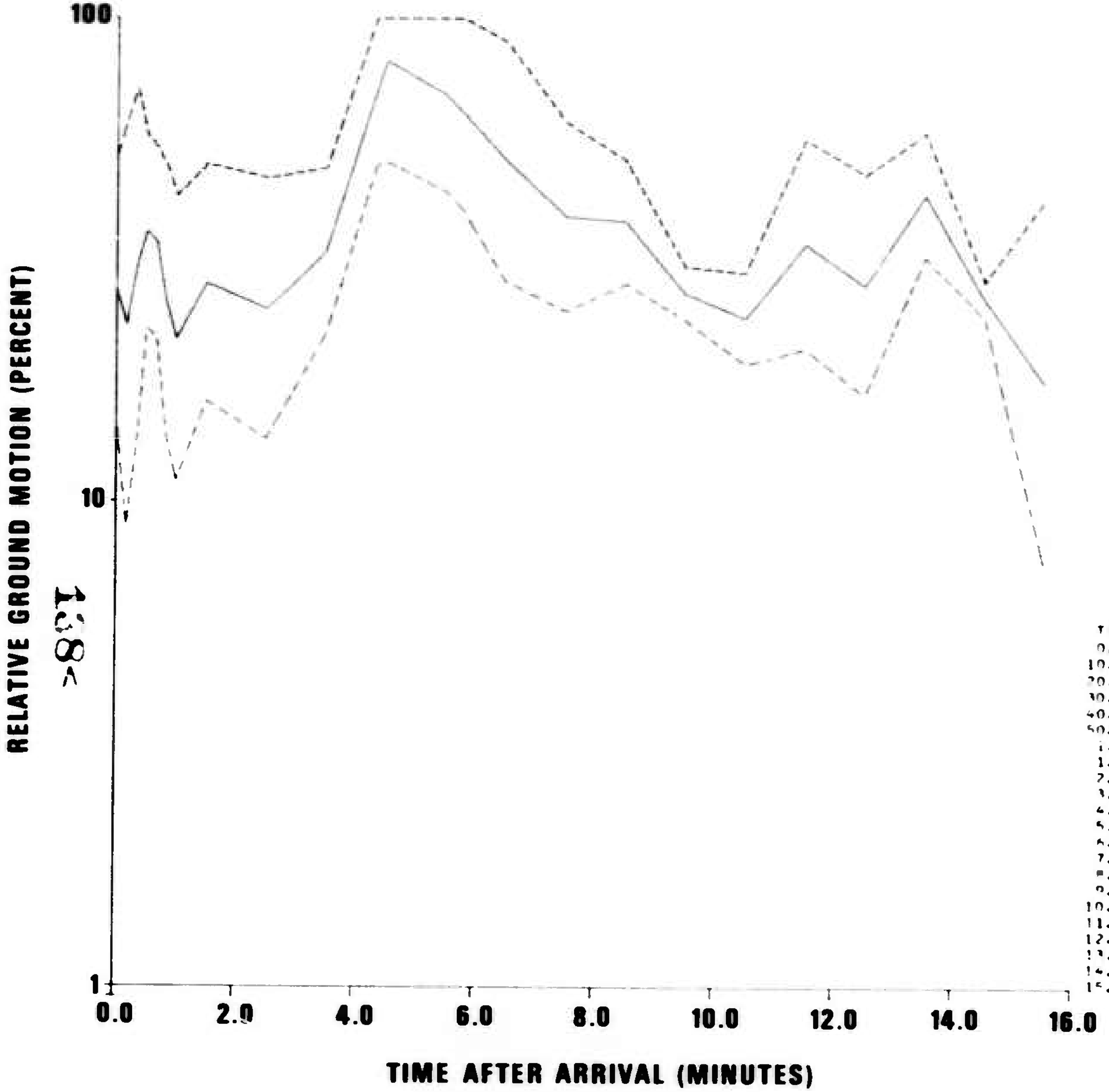


Figure AIII-9. Large-event coda averages 84-98°



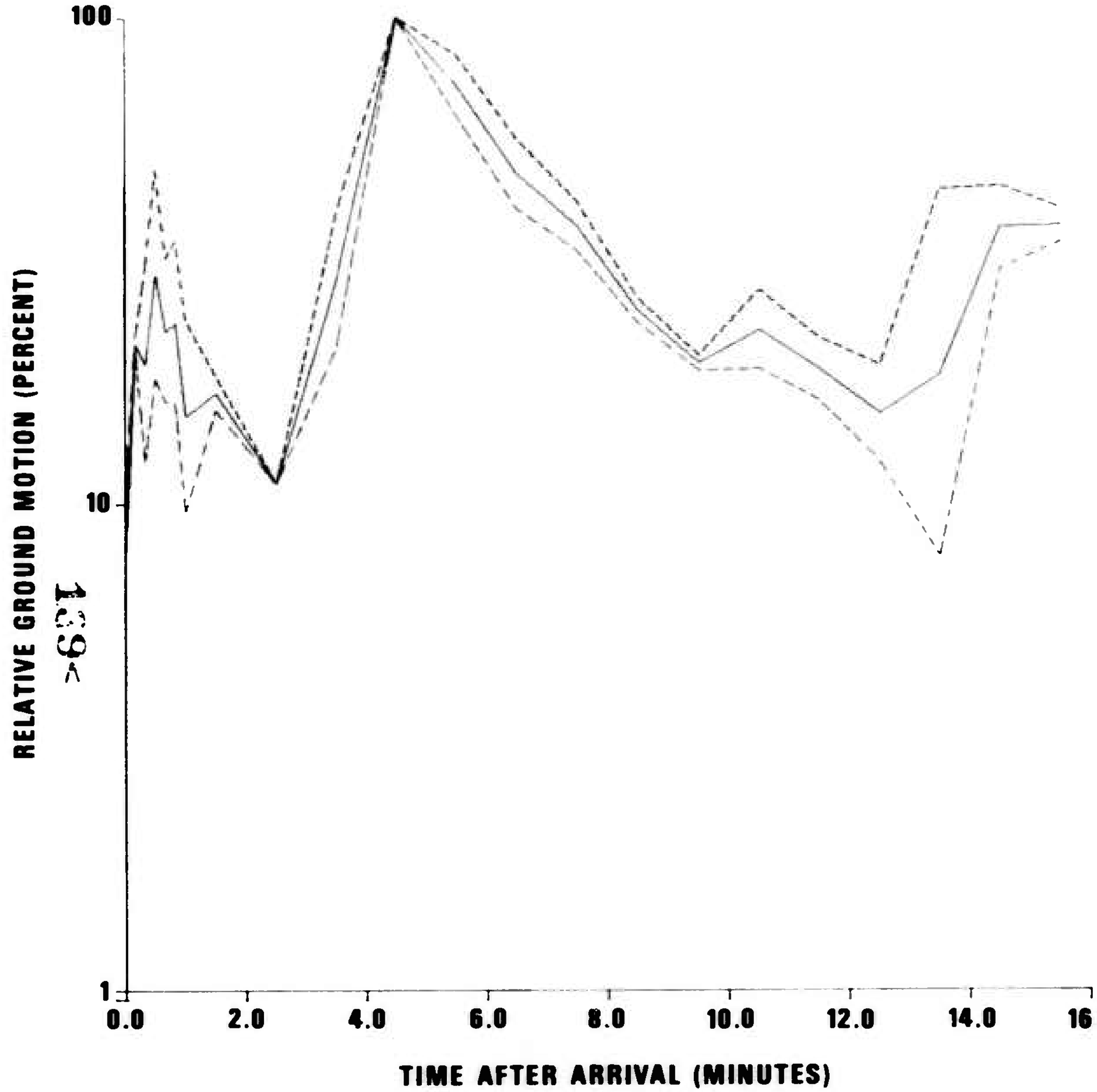
TIME		AVG	STD DEV	OBS
0.0	S	37.	[illegible]	8.
10.0	S	45.	0.35	8.
20.0	S	55.	[illegible]	8.
30.0	S	54.	[illegible]	8.
40.0	S	41.	0.16	8.
50.0	S	40.	[illegible]	8.
1.0	M	47.	0.24	8.
1.5	M	46.	0.17	8.
2.5	M	32.	[illegible]	8.
3.5	M	34.	0.16	8.
4.5	M	72.	[illegible]	7.
5.5	M	47.	0.11	7.
6.5	M	42.	0.21	7.
7.5	M	27.	[illegible]	7.
8.5	M	23.	[illegible]	7.
9.5	M	19.	[illegible]	7.
10.5	M	15.	[illegible]	7.
11.5	M	18.	0.34	7.
12.5	M	17.	[illegible]	6.
13.5	M	22.	0.15	6.
14.5	M	16.	[illegible]	6.
15.5	M	15.	0.14	6.

Figure AIII-10. Large-event coda averages 98-103°



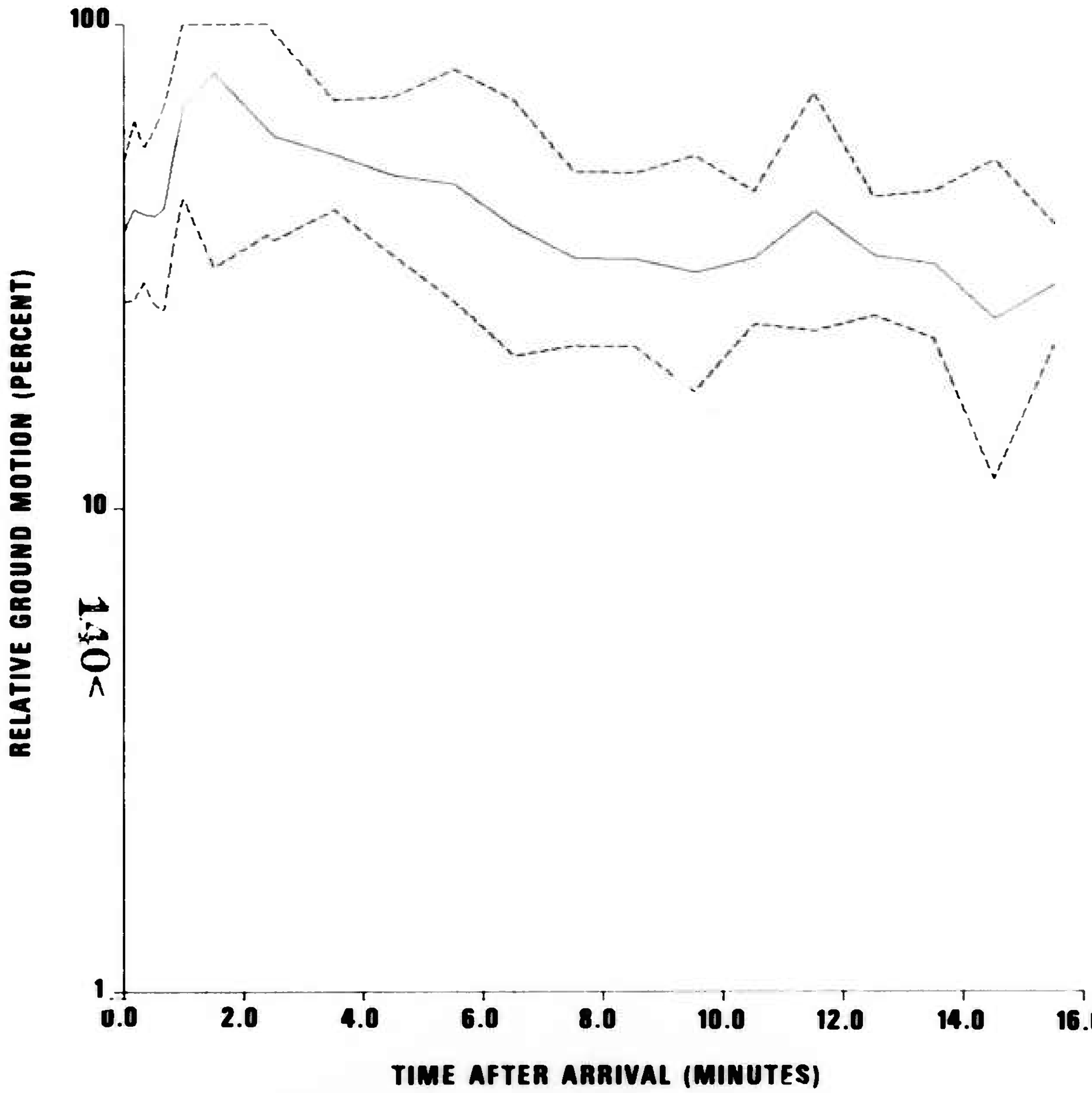
TIME		AVG	STD DEV	NOS
0.0	S	28.	0.27	5.
10.0	S	24.	0.42	5.
20.0	S	31.	0.17	5.
30.0	S	36.	0.23	5.
40.0	S	35.	0.19	5.
50.0	S	26.	0.23	5.
1.0	M	22.	0.28	5.
1.5	M	29.	0.24	5.
2.5	M	26.	0.27	5.
3.5	M	33.	0.17	5.
4.5	M	82.	0.15	5.
5.5	M	69.	0.14	5.
6.5	M	51.	0.25	5.
7.5	M	39.	0.13	5.
8.5	M	38.	0.13	4.
9.5	M	29.	0.04	4.
10.5	M	25.	0.23	4.
11.5	M	35.	0.21	4.
12.5	M	29.	0.21	4.
13.5	M	44.	0.13	4.
14.5	M	27.	0.24	4.
15.5	M	18.	0.34	4.

Figure AIII-11. Large-event coda averages 103-105°



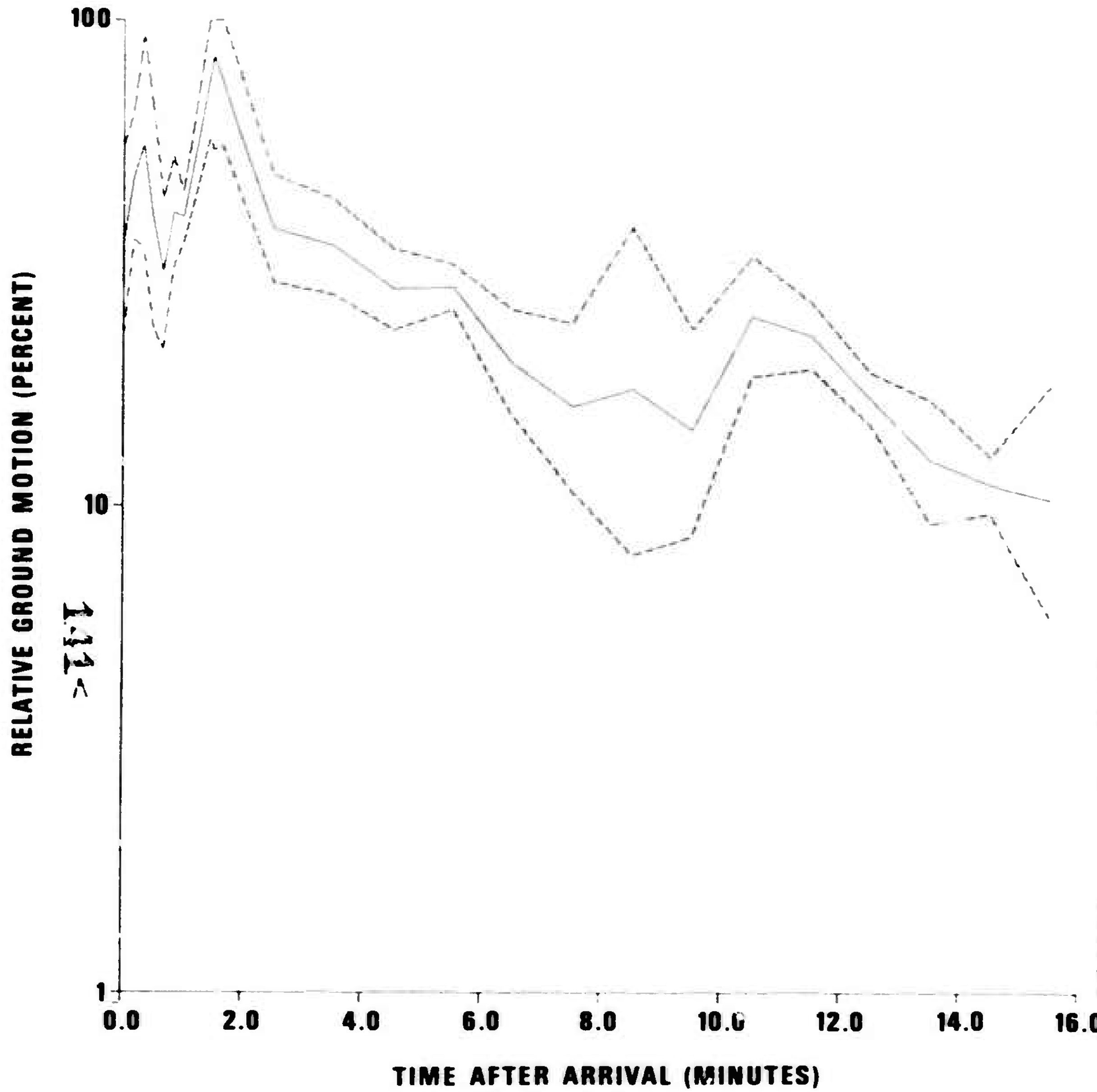
TIME		AVG	STD DEV	OBS
0.0	S	5.	0.07	2.
10.0	S	22.	0.01	2.
20.0	S	20.	0.23	2.
30.0	S	30.	0.21	2.
40.0	S	23.	0.15	2.
50.0	S	24.	0.17	2.
1.0	M	16.	0.20	2.
1.5	M	17.	0.04	2.
2.5	M	12.	0.0	2.
3.5	M	29.	0.14	2.
4.5	M	101.	0.0	2.
5.5	M	73.	0.06	2.
6.5	M	49.	0.07	2.
7.5	M	37.	0.05	2.
8.5	M	25.	0.02	2.
9.5	M	20.	0.02	2.
10.5	M	23.	0.08	2.
11.5	M	15.	0.06	2.
12.5	M	16.	0.10	2.
13.5	M	15.	0.36	2.
14.5	M	37.	0.08	2.
15.5	M	37.	0.03	2.

Figure AIII-12. Large-event coda averages 105-110°



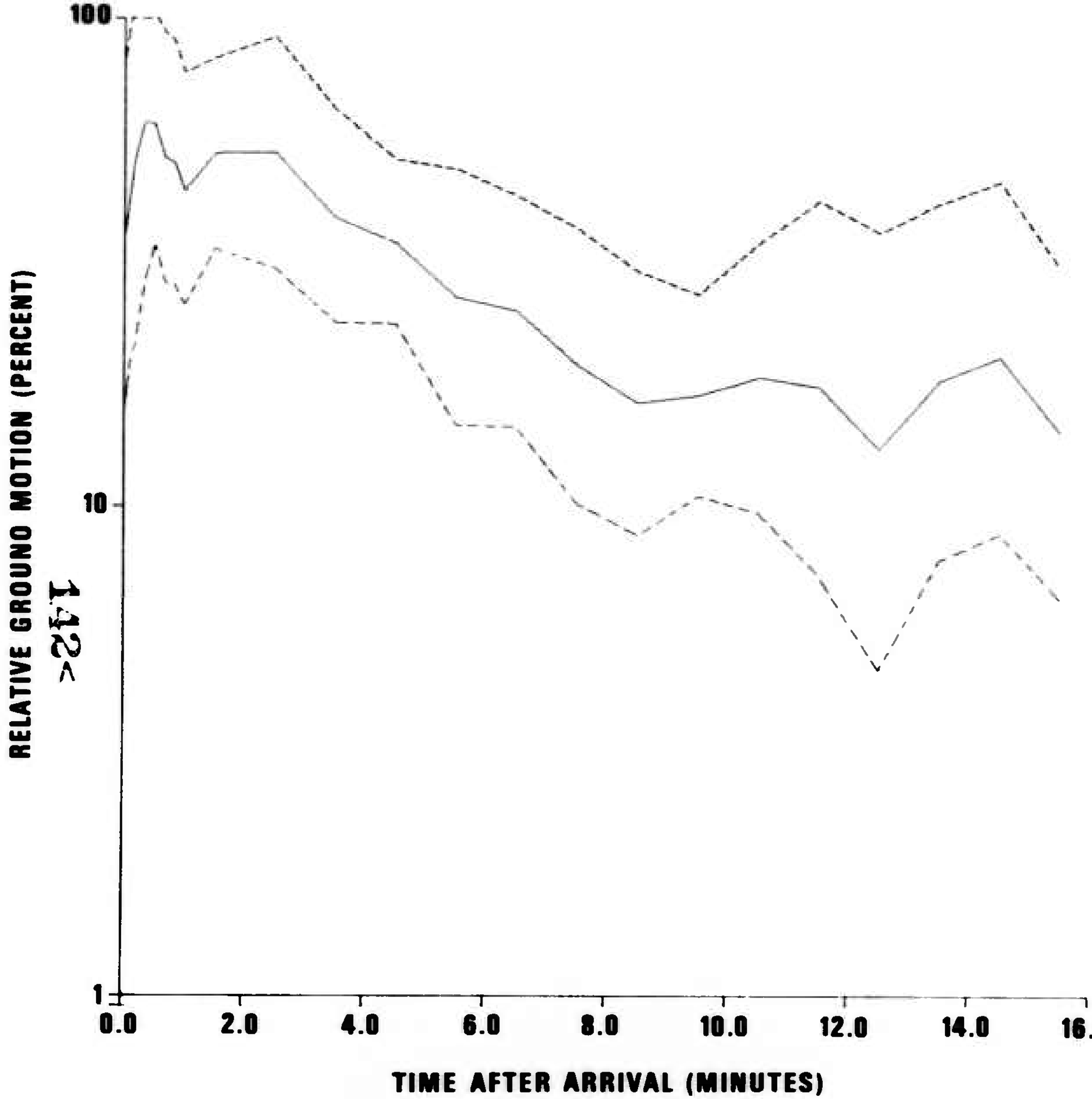
TIME		AVG	STD DEV	OBS
0.0	S	38.	0.14	8.
10.0	S	42.	0.19	9.
20.0	S	41.	0.14	8.
30.0	S	40.	0.18	8.
40.0	S	42.	0.21	8.
50.0	S	54.	0.19	8.
1.0	M	69.	0.18	8.
1.5	M	80.	0.25	8.
2.5	M	59.	0.21	6.
3.5	M	54.	0.11	4.
4.5	M	49.	0.17	4.
5.5	M	47.	0.24	8.
6.5	M	38.	0.26	8.
7.5	M	33.	0.18	8.
8.5	M	33.	0.18	7.
9.5	M	31.	0.24	7.
10.5	M	33.	0.14	6.
11.5	M	41.	0.25	5.
12.5	M	33.	0.17	5.
13.5	M	32.	0.15	5.
14.5	M	25.	0.33	5.
15.5	M	29.	0.12	5.

Figure AIII-13. Large-event coda averages 110-115°



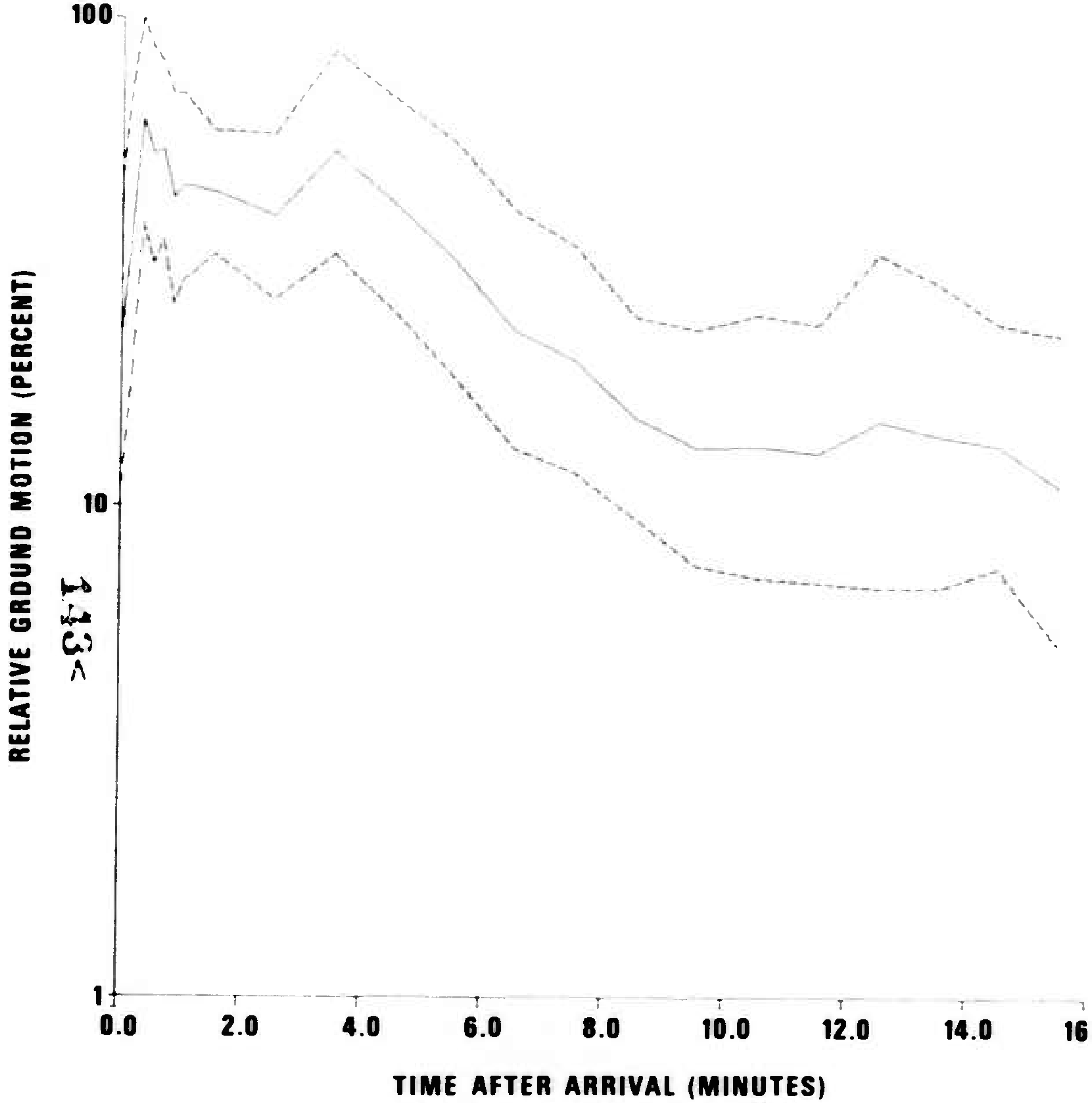
TIME	AVG	STD DEV	OBS
0.0 S	36.	[illegible]	3.
10.0 S	49.	0.13	3.
20.0 S	57.	0.22	3.
30.0 S	40.	[illegible]	3.
40.0 S	31.	0.14	3.
50.0 S	41.	0.12	3.
1.0 M	40.	0.25	3.
1.5 M	85.	0.13	3.
2.5 M	38.	0.11	3.
3.5 M	35.	0.10	3.
4.5 M	26.	[illegible]	3.
5.5 M	29.	0.05	3.
6.5 M	20.	0.11	3.
7.5 M	16.	0.17	3.
8.5 M	18.	0.34	3.
9.5 M	15.	0.21	3.
10.5 M	25.	0.17	3.
11.5 M	23.	0.07	3.
12.5 M	17.	[illegible]	2.
13.5 M	13.	0.12	3.
14.5 M	11.	0.04	3.
15.5 M	11.	[illegible]	2.

Figure AIII-14. Large-event coda averages 115-118°



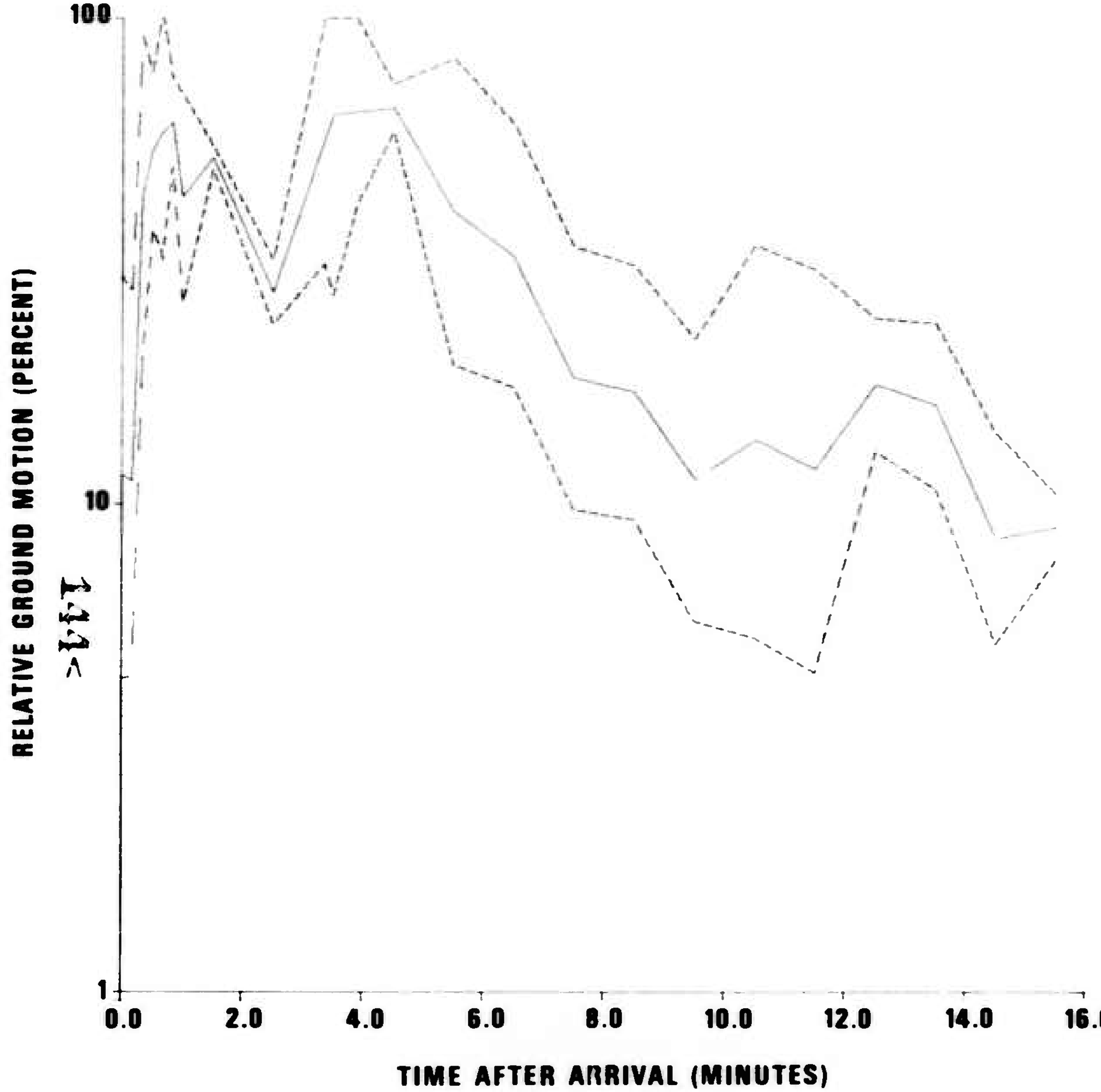
TIME		AVG	STD DEV	OBS
0.0	S	37.	0.36	13.
10.0	S	52.	0.34	13.
20.0	S	62.	0.27	13.
30.0	S	61.	0.23	13.
40.0	S	53.	0.25	13.
50.0	S	51.	0.25	13.
1.0	M	45.	0.24	13.
1.5	M	54.	0.19	12.
2.5	M	54.	0.24	12.
3.5	M	40.	0.22	12.
4.5	M	35.	0.17	11.
5.5	M	27.	0.26	11.
6.5	M	26.	0.24	10.
7.5	M	20.	0.29	9.
8.5	M	17.	0.27	9.
9.5	M	17.	0.21	9.
10.5	M	19.	0.29	9.
11.5	M	18.	0.33	8.
12.5	M	14.	0.45	8.
13.5	M	15.	0.37	7.
14.5	M	21.	0.36	6.
15.5	M	15.	0.34	6.

Figure AIII-15. Large-event coda averages 118-127°



TIME		AVG	STD DEV	OBS
0.0	S	24.	[illegible]	14.
10.0	S	37.	[illegible]	16.
20.0	S	63.	0.21	16.
30.0	S	53.	[illegible]	14.
40.0	S	54.	0.13	16.
50.0	S	47.	0.21	16.
1.0	M	46.	0.19	15.
1.5	M	44.	0.13	15.
2.5	M	40.	0.17	15.
3.5	M	53.	0.21	14.
4.5	M	42.	[illegible]	14.
5.5	M	32.	0.24	13.
6.5	M	24.	0.24	12.
7.5	M	20.	[illegible]	12.
8.5	M	16.	0.21	11.
9.5	M	14.	0.24	11.
10.5	M	14.	0.27	11.
11.5	M	13.	[illegible]	11.
12.5	M	16.	0.24	11.
13.5	M	15.	0.21	11.
14.5	M	14.	[illegible]	10.
15.5	M	11.	0.21	10.

Figure AIII-16. Large-event coda averages 127-136°



TIME		AVG	STD DEV	OBS
0.0	S	12.	0.41	3.
10.0	S	12.	0.40	3.
20.0	S	44.	0.33	3.
30.0	S	54.	0.16	3.
40.0	S	59.	0.75	3.
50.0	S	62.	0.09	3.
1.0	M	43.	0.71	3.
1.5	M	52.	[illegible]	3.
2.5	M	28.	0.07	3.
3.5	M	64.	0.29	3.
4.5	M	66.	0.05	3.
5.5	M	40.	0.32	3.
6.5	M	33.	0.27	3.
7.5	M	19.	0.27	3.
8.5	M	17.	[illegible]	3.
9.5	M	12.	0.29	3.
10.5	M	14.	0.40	3.
11.5	M	12.	0.41	3.
12.5	M	18.	0.14	3.
13.5	M	16.	0.17	3.
14.5	M	9.	0.21	3.
15.5	M	9.	[illegible]	3.

Figure AIII-17. Large-event coda averages 136-140°

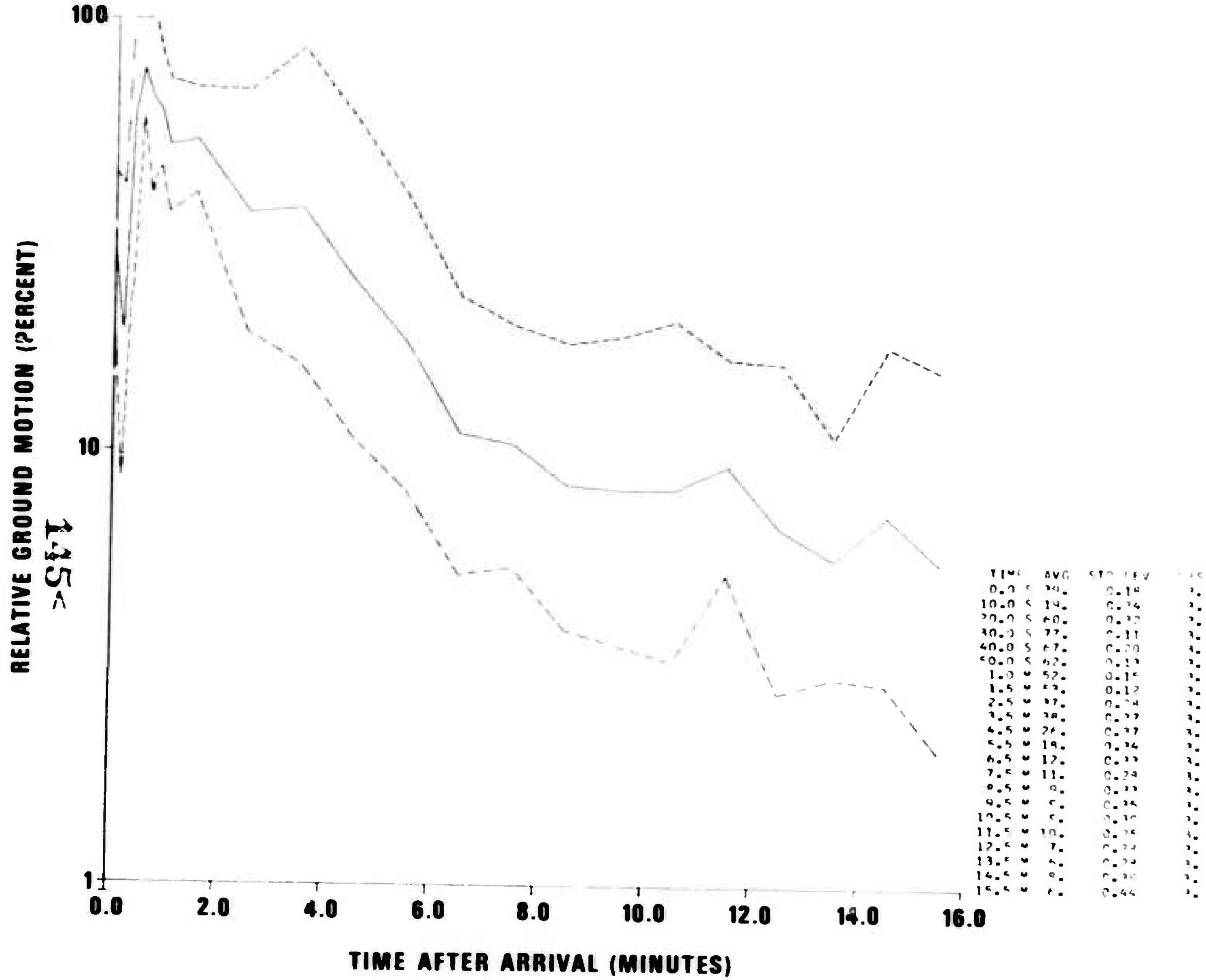
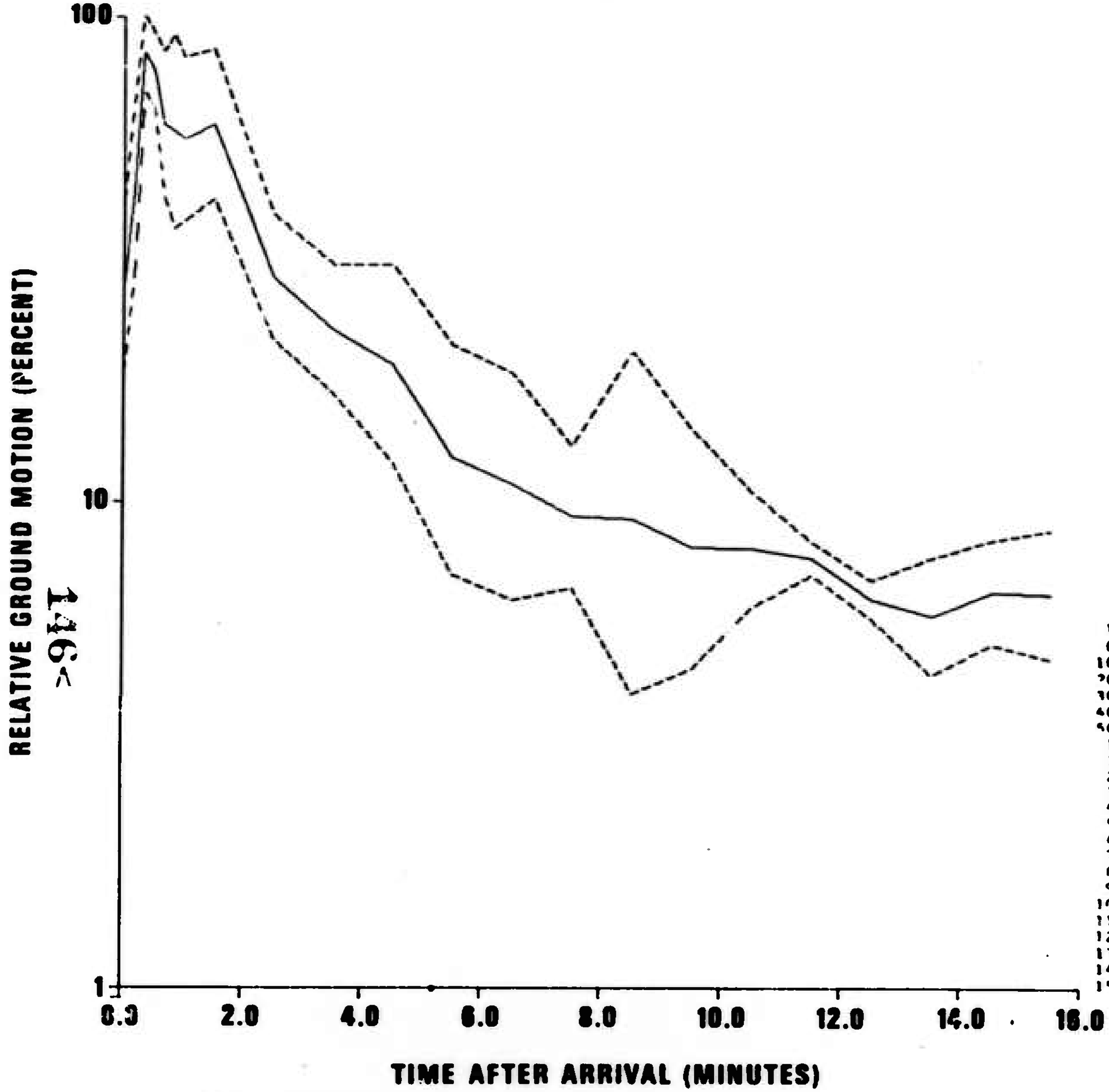


Figure AIII-18. Large-event coda averages 140-145°



TIME		AVG	STD DEV	OBS
0.0	S	29.	0.13	5.
10.0	S	45.	0.19	5.
20.0	S	85.	0.09	5.
30.0	S	79.	0.09	5.
40.0	S	61.	0.15	5.
50.0	S	55.	0.20	5.
1.0	M	57.	0.17	5.
1.5	M	61.	0.15	5.
2.5	M	30.	0.13	5.
3.5	M	22.	0.11	5.
4.5	M	20.	0.21	5.
5.5	M	13.	0.24	5.
6.5	M	11.	0.23	5.
7.5	M	10.	0.14	4.
8.5	M	10.	0.15	4.
9.5	M	8.	0.24	4.
10.5	M	8.	0.12	4.
11.5	M	[illegible]	[illegible]	3.
12.5	M	7.	0.24	3.
13.5	M	6.	0.12	3.
14.5	M	7.	0.11	3.
15.5	M	7.	0.13	3.

Figure AIII-19. Large-event coda averages 145-155°

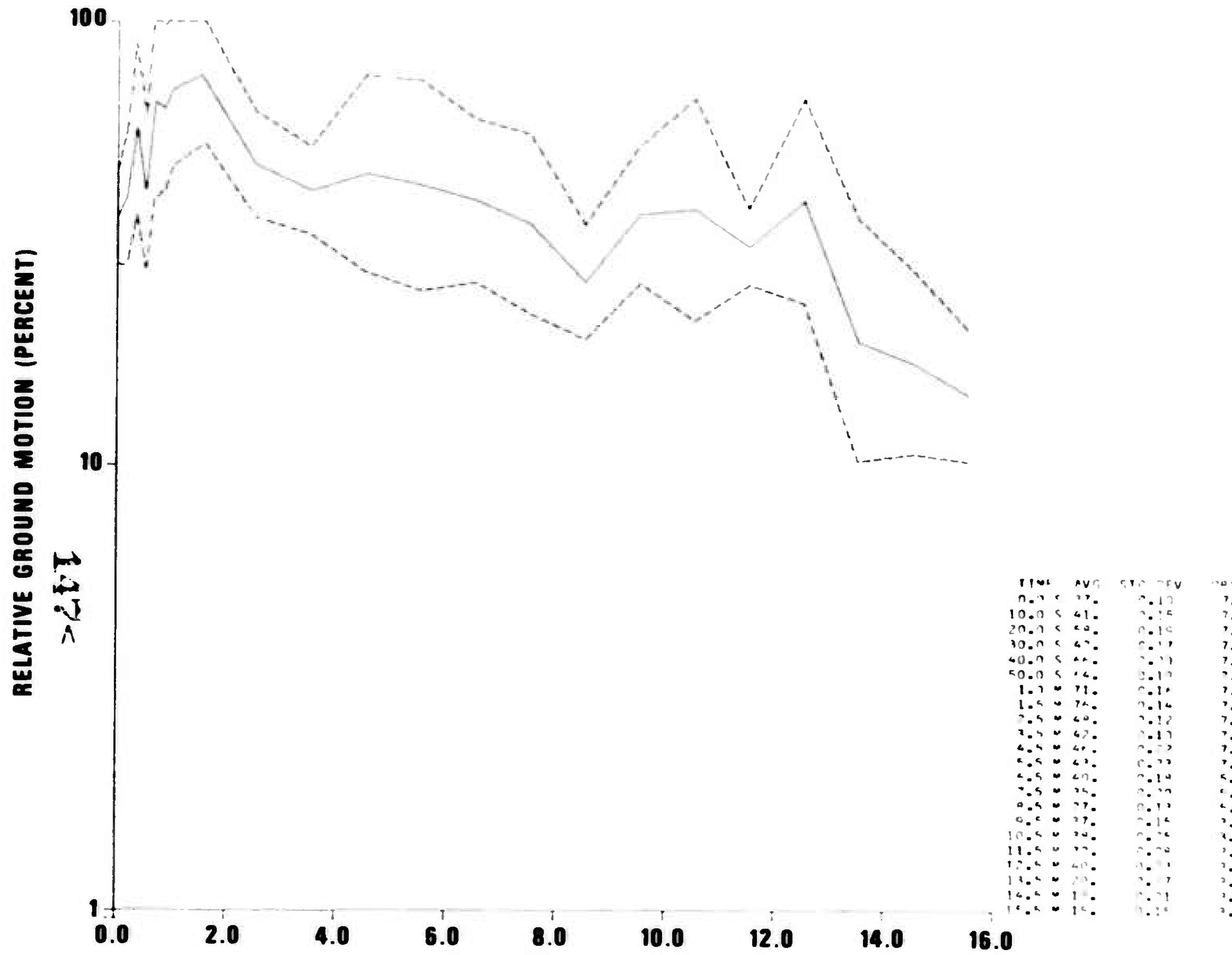


Figure AIII-20. Large-event coda averages 155-166°

APPENDIX IV

Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue); ± one standard deviation of the individual coda observations about the average shown by dashed lines (blue).

1. COR, 11.0°
2. LON, 12.8°
3. VIC, 14.8°
4. RCD, 15.3°
5. ALB, 15.8°
6. FAV, 19.8°
7. FSJ, 20.6°
8. SLM, 23.0°
9. TPM, 23.0°
10. CHI, 25.0°
11. LHC, 25.9°
12. YKC, 28.4°
13. FCC, 29.4°
14. SUD, 30.7°
15. BLC, 33.1°
16. GEO, 33.2°
17. INK, 35.1°
18. COL, 35.4°
19. KIP, 37.0°
20. SFA, 37.7°
21. SCH, 40.9°
22. MBC, 42.0°
23. RES, 42.0°
24. FBC, 42.3°
25. BHP, 43.6°
26. STJ, 49.8°
27. ALE, 51.8°
28. CAR, 52.5°
29. CUM, 54.7°
30. KTG, 60.0°
31. ARE, 67.5°
32. KEV, 73.0°
33. VAL, 73.5°
34. ESK, 74.8°
35. SOD, 75.0°
36. KJN, 78.1°
37. NUR, 80.6°
38. PTO, 80.8°
39. GUA, 87.8°
40. KOA, 90.2°
41. AQU, 91.6°
42. TAV, 91.9°
43. PMG, 92.3°

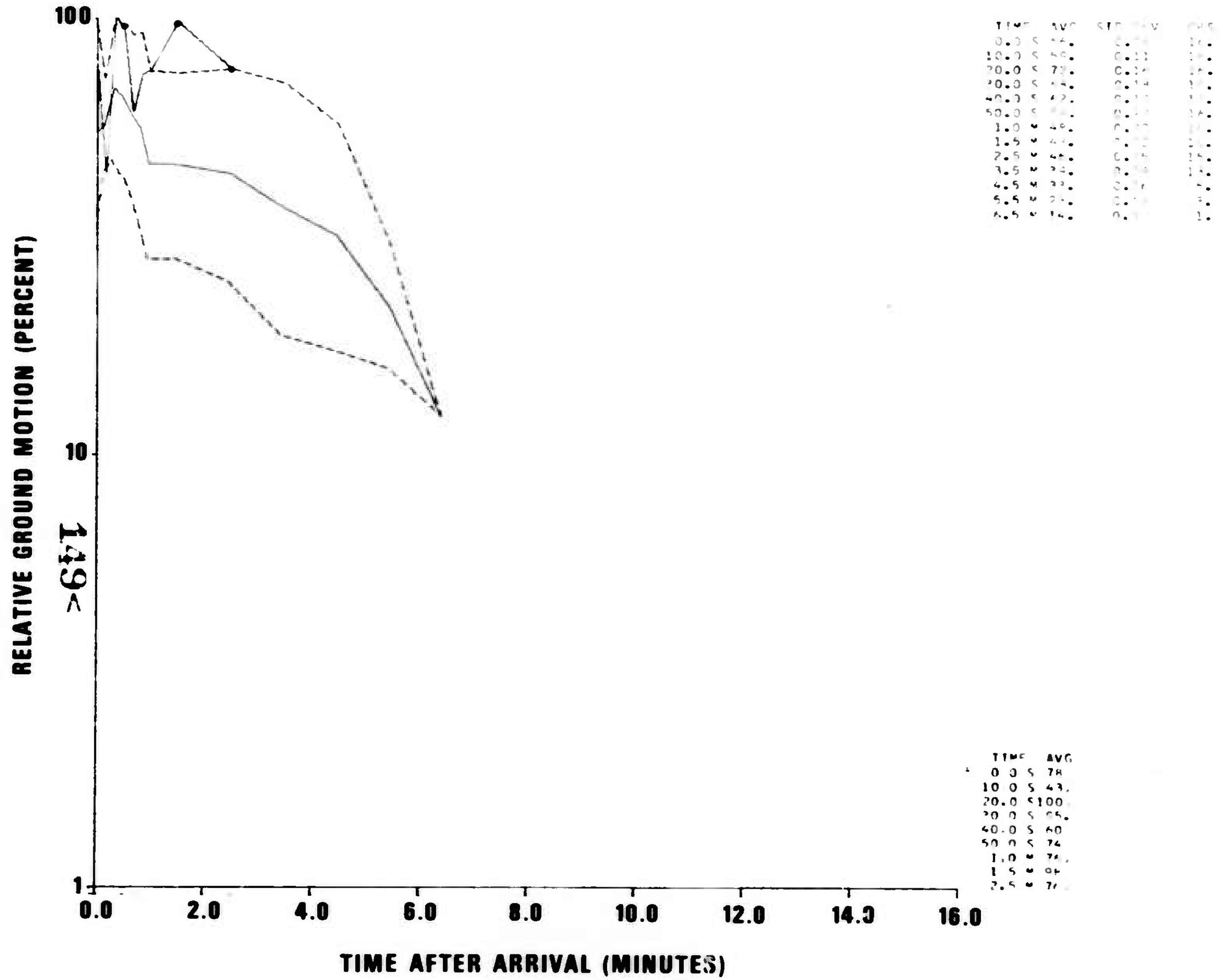


Figure AIV-1. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) COR, 11.0°

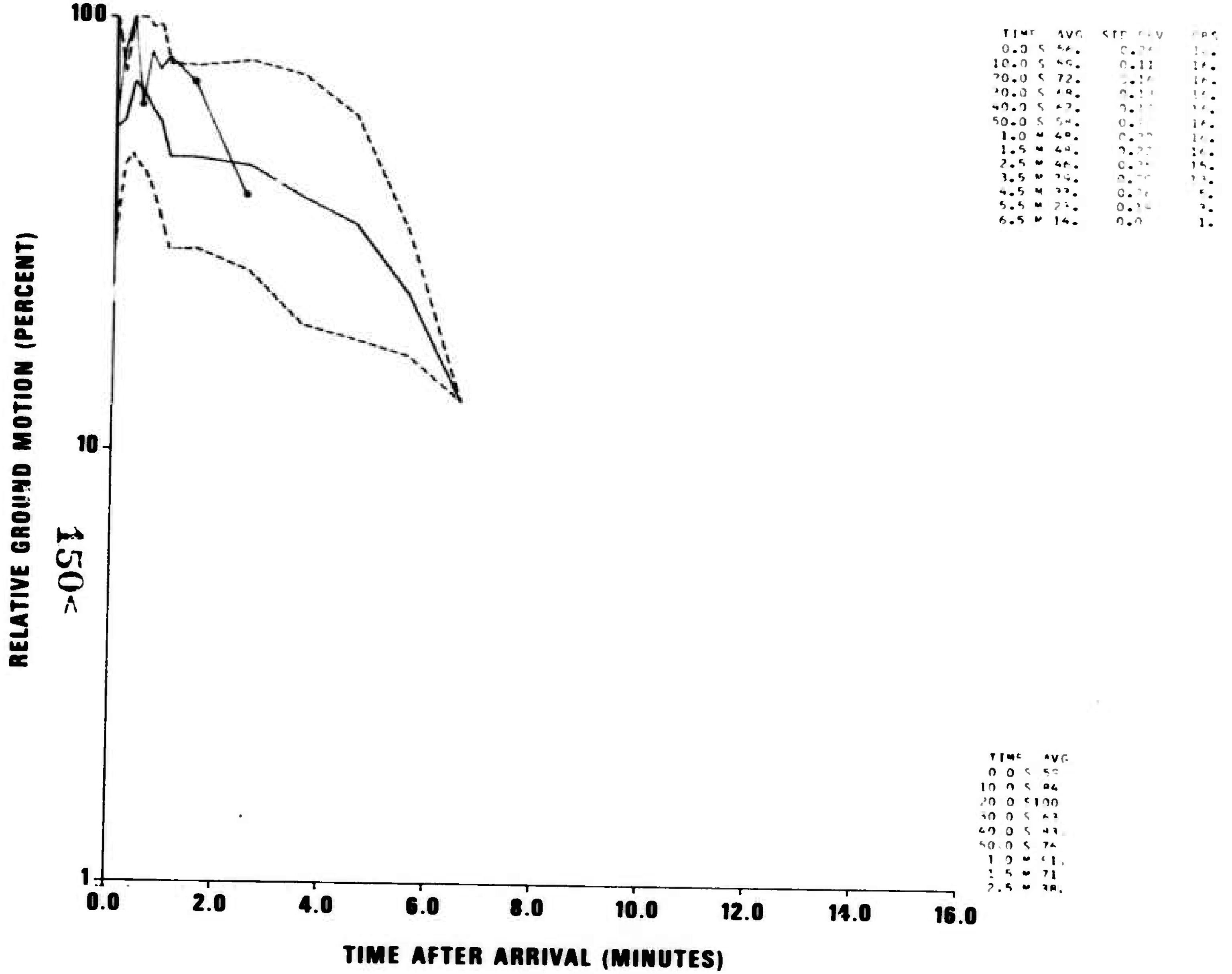


Figure AIV-2. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) LON, 12.8°

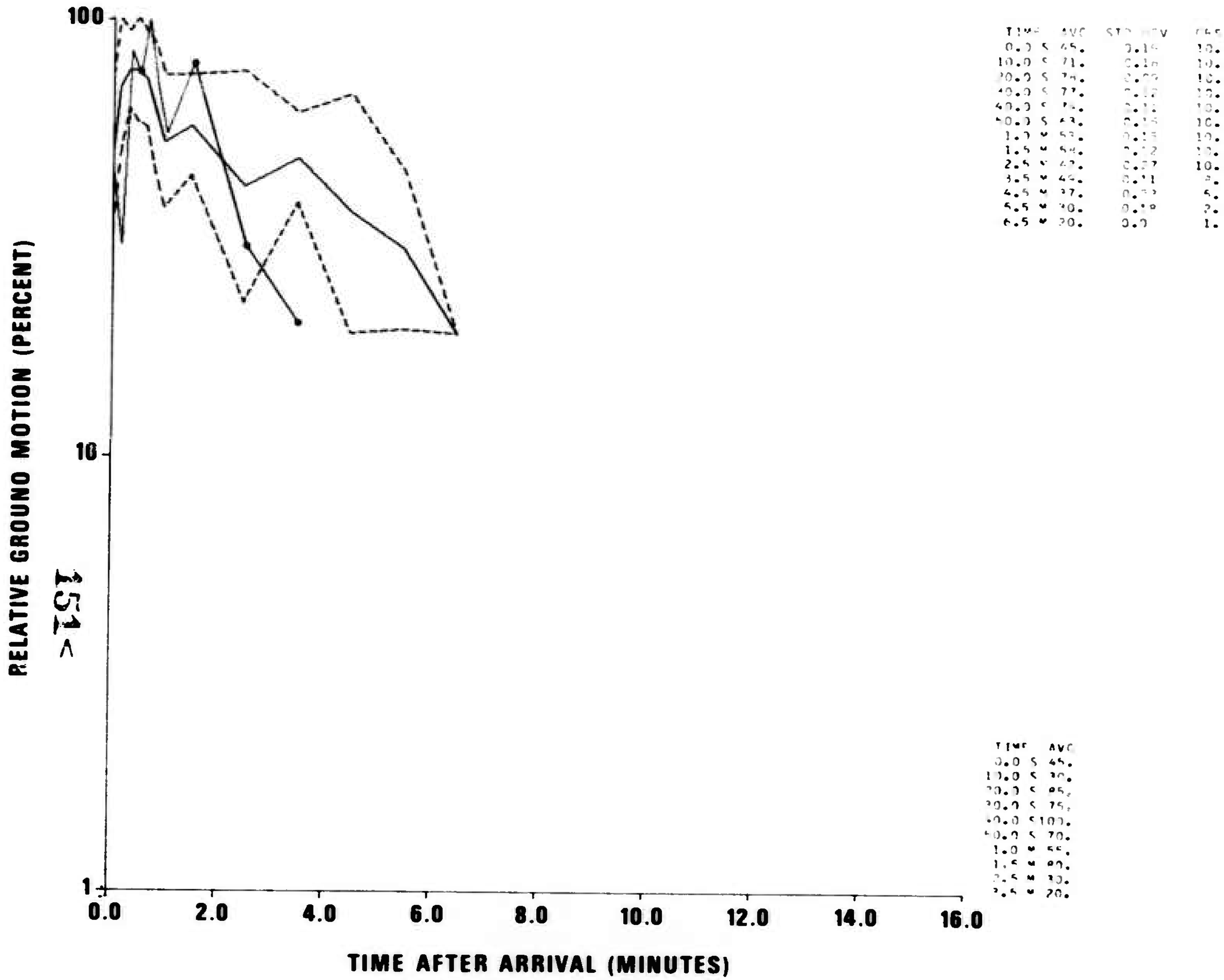
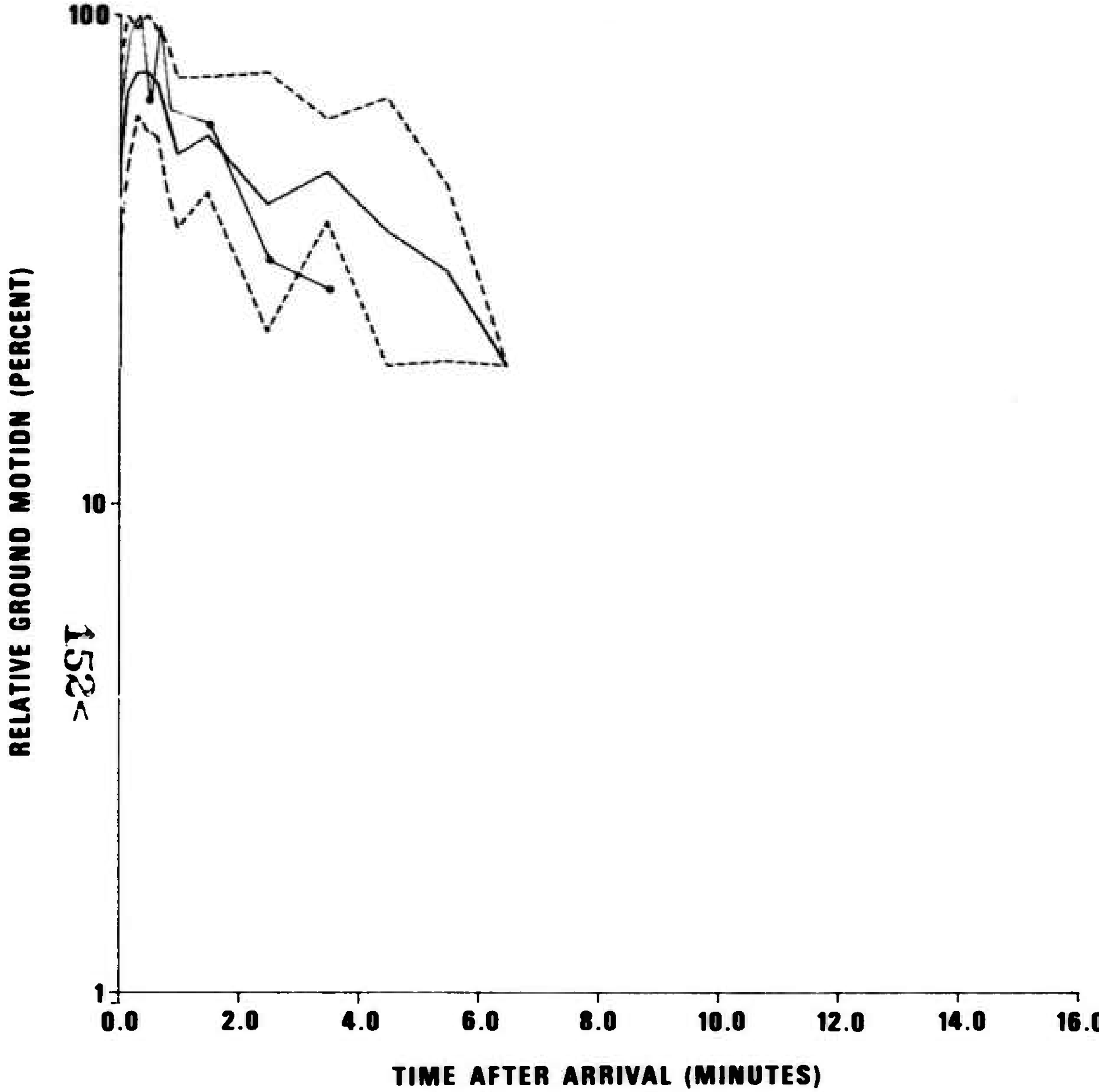


Figure AIV-3. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) VIC, 14.8°



TIME		AVG	STD DEV	OBS
0.0	S	65.	0.15	10.
10.0	S	71.	0.16	10.
20.0	S	78.	0.09	10.
30.0	S	77.	0.12	10.
40.0	S	74.	0.11	10.
50.0	S	63.	0.15	10.
1.0	M	53.	0.15	10.
1.5	M	54.	0.12	10.
2.5	M	42.	0.27	10.
3.5	M	45.	0.11	8.
4.5	M	37.	0.23	5.
5.5	M	30.	0.15	2.
6.5	M	20.	0.0	1.

TIME		AVG
0.0	S	66.
10.0	S	91.
20.0	S	100.
30.0	S	66.
40.0	S	95.
50.0	S	64.
1.0	M	63.
1.5	M	60.
2.5	M	31.
3.5	M	27.

Figure AIV-4. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) RCD, 15.3°

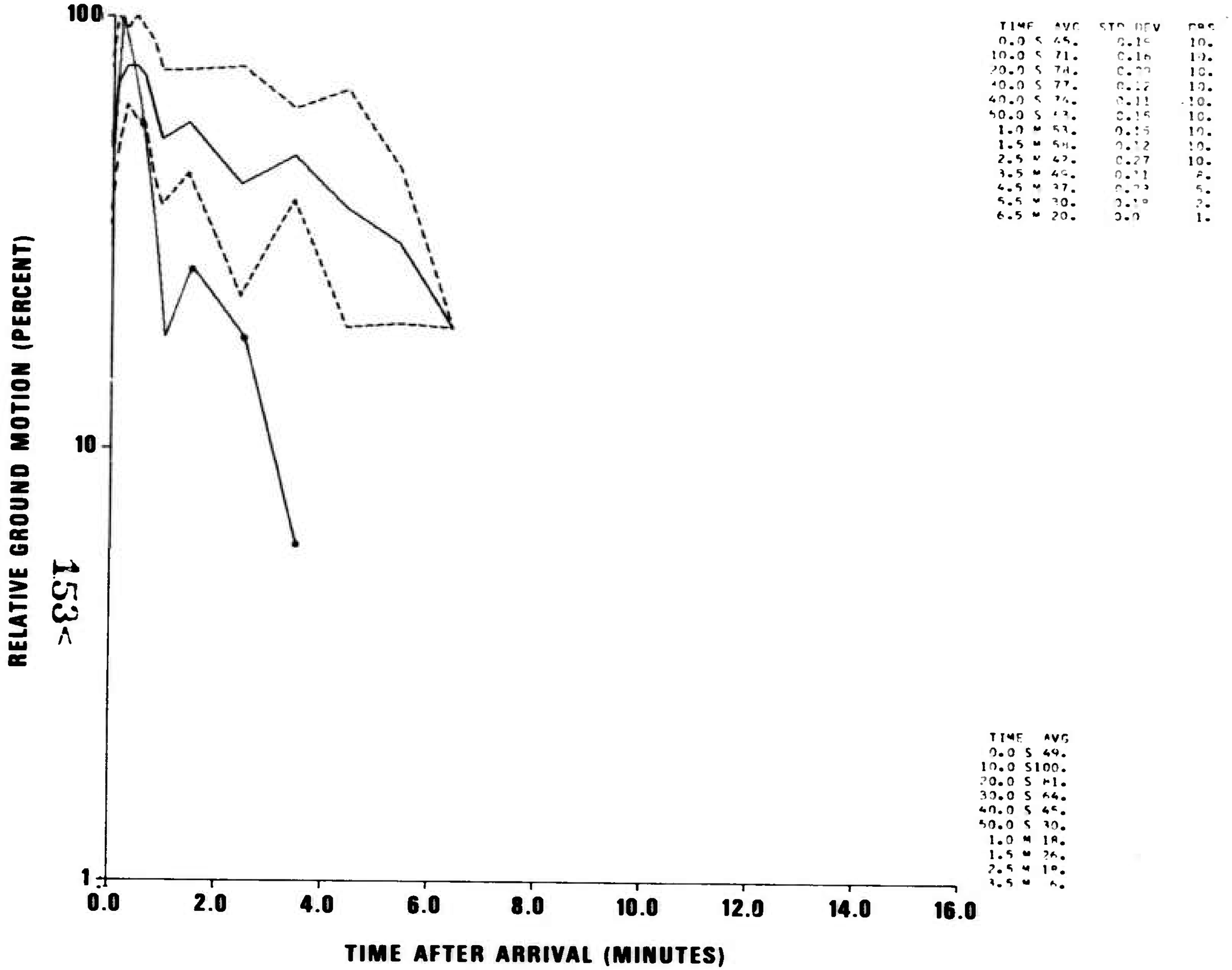
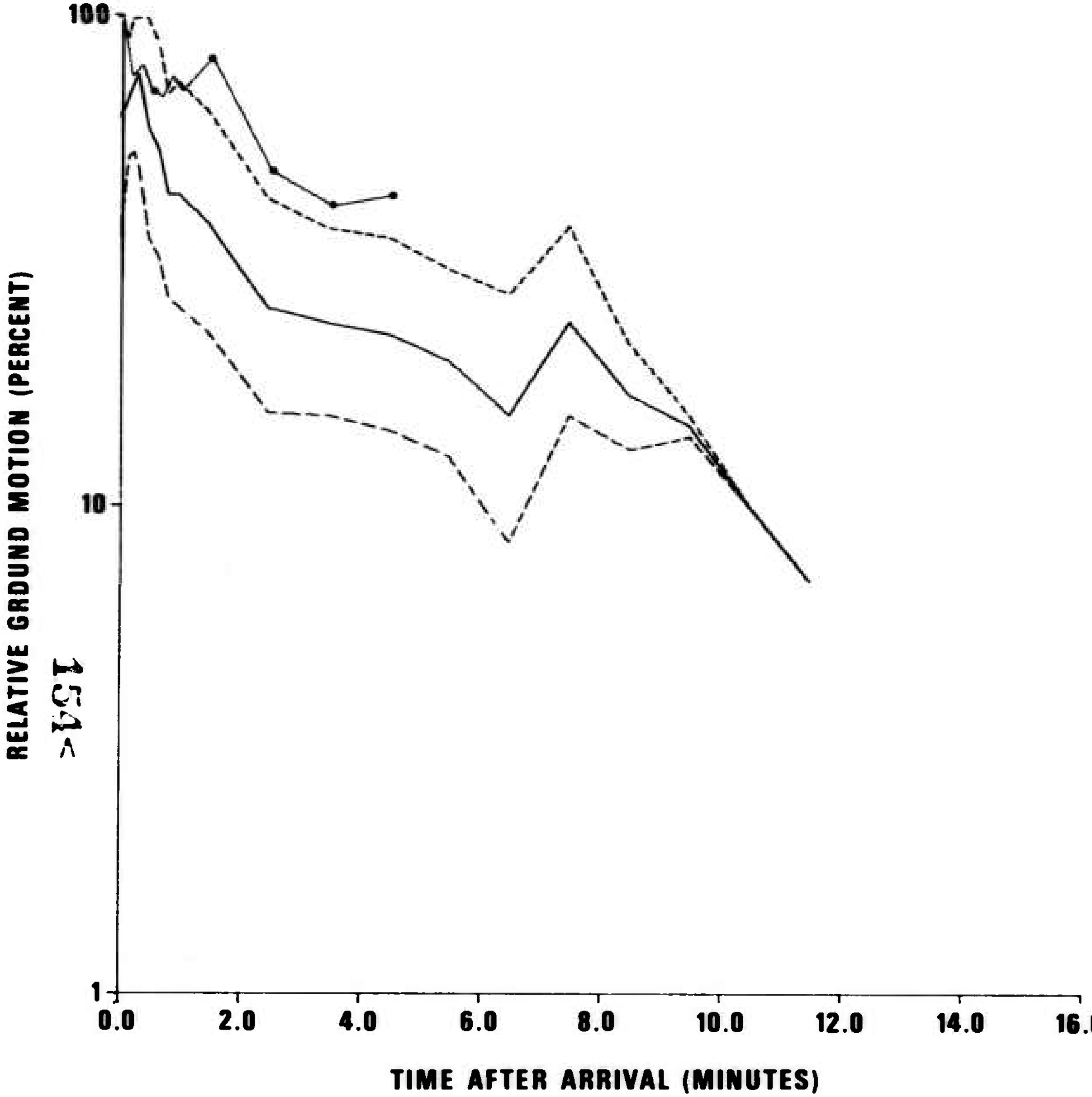


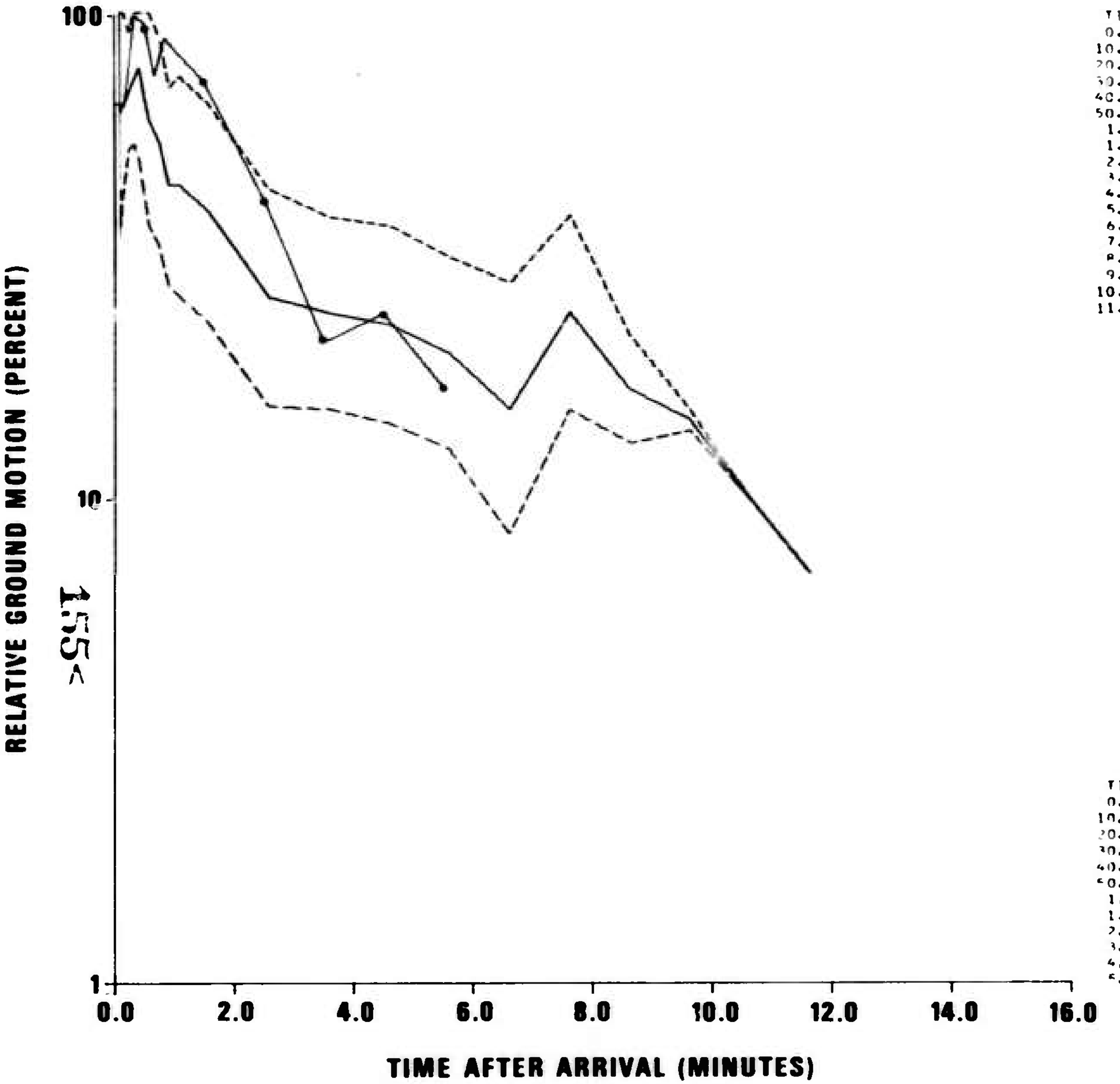
Figure AIV-5. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) ALB, 15.8°



TIME		AVG	STD DEV	OBS
0.0	S	62.	0.24	25.
10.0	S	69.	0.12	25.
20.0	S	79.	0.15	25.
30.0	S	61.	0.22	25.
40.0	S	55.	0.22	25.
50.0	S	44.	0.21	25.
1.0	M	44.	0.23	25.
1.5	M	35.	0.23	24.
2.5	M	26.	0.22	21.
3.5	M	24.	0.20	16.
4.5	M	[illegible]	0.20	13.
5.5	M	20.	0.19	11.
6.5	M	16.	0.26	8.
7.5	M	24.	0.20	4.
8.5	M	17.	0.11	2.
9.5	M	15.	0.07	2.
10.5	M	11.	0.0	1.
11.5	M	8.	0.0	1.

20.0	S	79
30.0	S	70
40.0	S	[illegible]
50.0	S	
1.0	M	
1.5	M	[illegible]
2.5	M	48
3.5	M	41
4.5	M	[illegible]

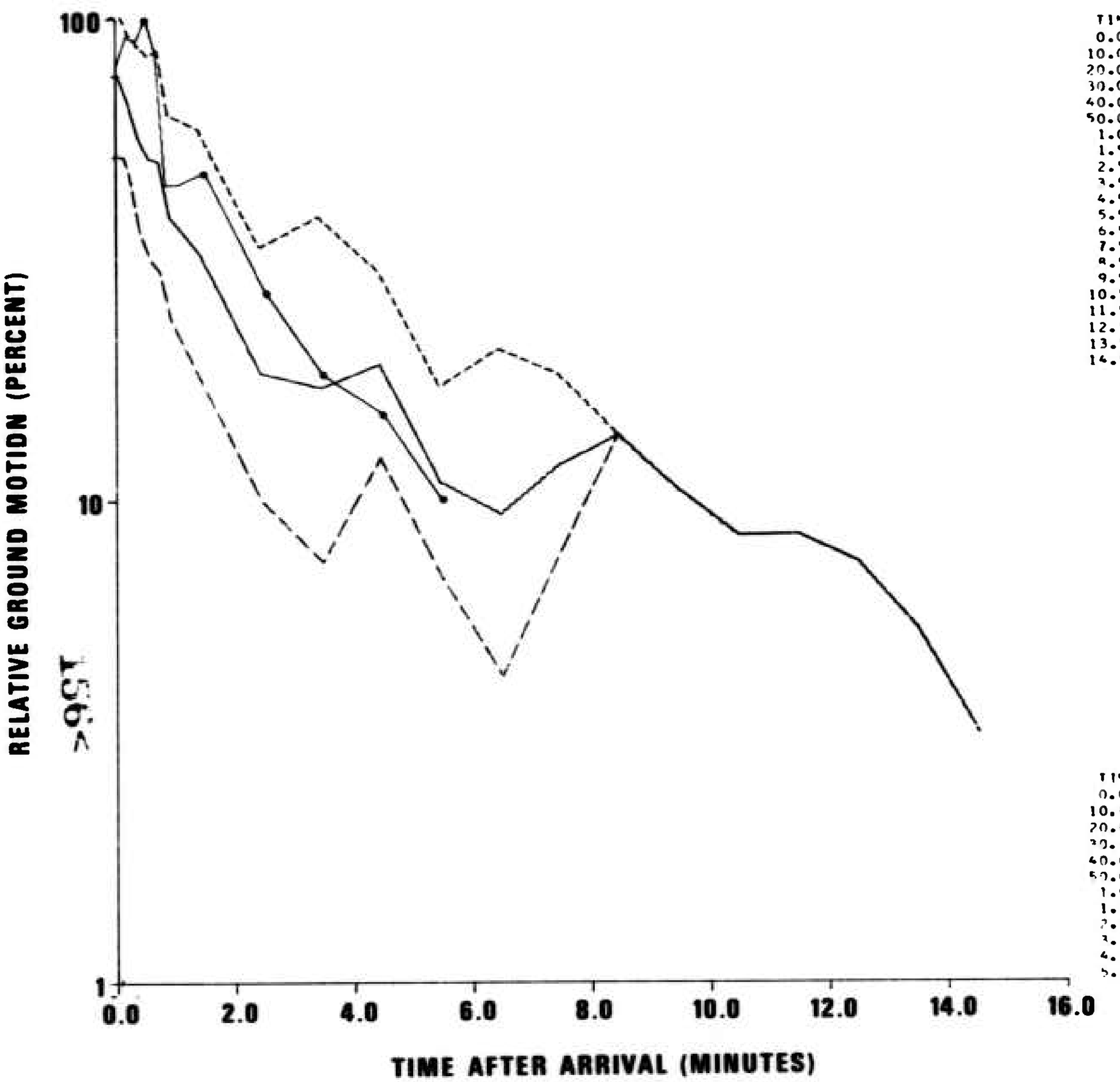
Figure AIV-6. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) FAV, 19.8°



TIME		AVG	STD DEV	OBS
0.0	S	62.	0.24	25.
10.0	S	65.	0.12	25.
20.0	S	78.	0.15	25.
30.0	S	61.	0.22	25.
40.0	S	55.	0.22	25.
50.0	S	44.	0.21	25.
1.0	M	44.	0.23	25.
1.5	M	35.	0.23	24.
2.5	M	26.	0.22	21.
3.5	M	24.	0.20	16.
4.5	M	23.	0.20	13.
5.5	M	20.	0.19	11.
6.5	M	16.	0.26	8.
7.5	M	24.	0.20	4.
8.5	M	17.	0.11	2.
9.5	M	15.	0.02	2.
10.5	M	11.	0.0	1.
11.5	M	8.	0.0	1.

TIME		AVG
0.0	S	66.
10.0	S	65.
20.0	S	100.
30.0	S	96.
40.0	S	75.
50.0	S	90.
1.0	M	85.
1.5	M	73.
2.5	M	41.
3.5	M	21.
4.5	M	24.
5.5	M	17.

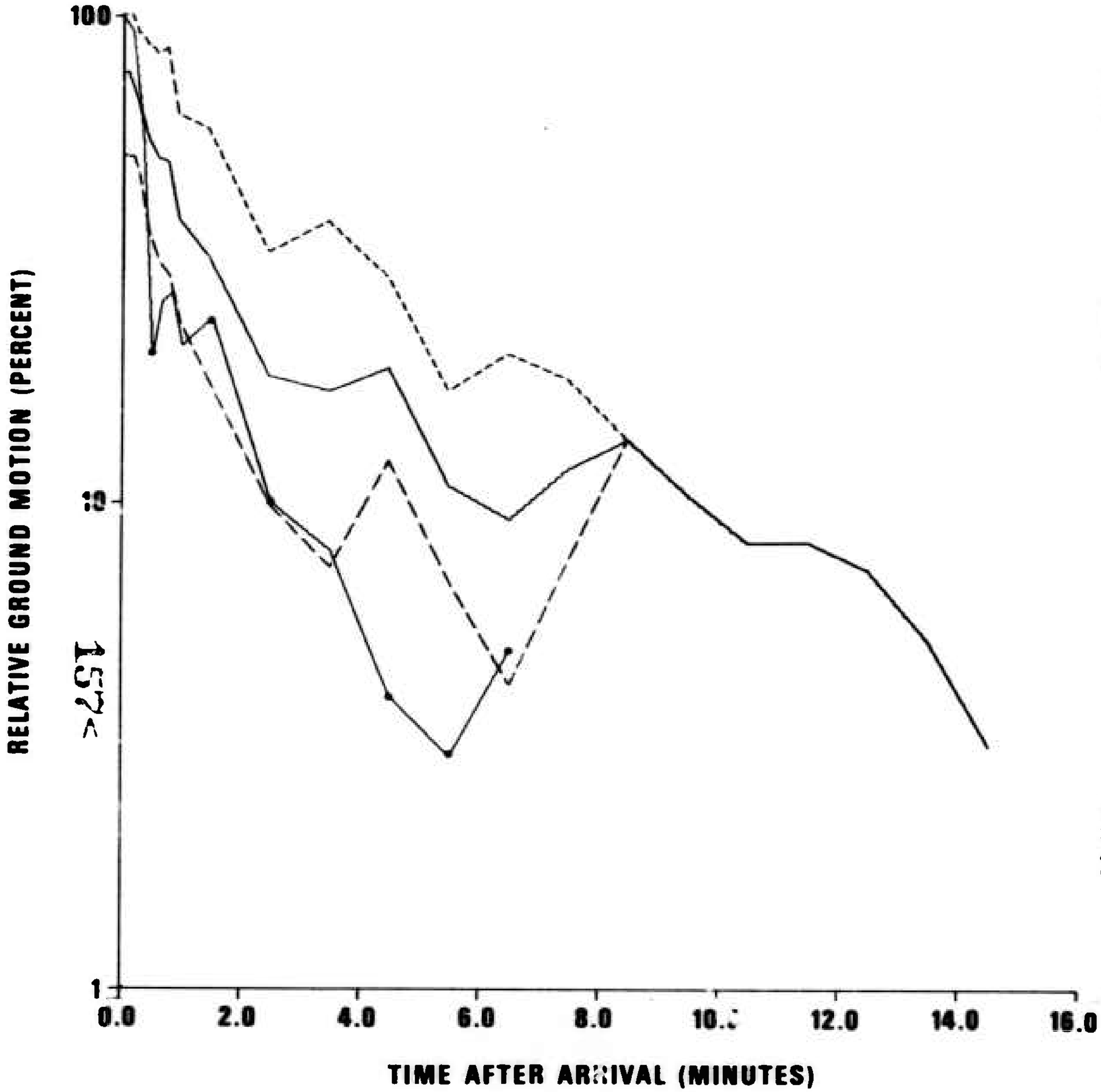
Figure AIV-7. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) FSJ, 20.6°



TIME		AVG	STD DEV	OBS
0.0	S	76.	0.15	11.
10.0	S	77.	0.14	11.
20.0	S	67.	0.14	11.
30.0	S	56.	0.19	11.
40.0	S	51.	0.21	11.
50.0	S	50.	0.23	11.
1.0	M	39.	0.21	11.
1.5	M	32.	0.26	11.
2.5	M	19.	0.26	10.
3.5	M	17.	0.36	8.
4.5	M	19.	0.19	8.
5.5	M	11.	0.19	7.
6.5	M	10.	0.34	6.
7.5	M	12.	0.19	3.
8.5	M	14.	0.0	1.
9.5	M	11.	0.0	1.
10.5	M	9.	0.0	1.
11.5	M	9.	0.0	1.
12.5	M	8.	0.0	1.
13.5	M	6.	0.0	1.
14.5	M	4.	0.0	1.

TIME		AVG
0.0	S	83.
10.0	S	92.
20.0	S	90.
30.0	S	100.
40.0	S	85.
50.0	S	45.
1.0	M	45.
1.5	M	48.
2.5	M	27.
3.5	M	18.
4.5	M	15.
5.5	M	10.

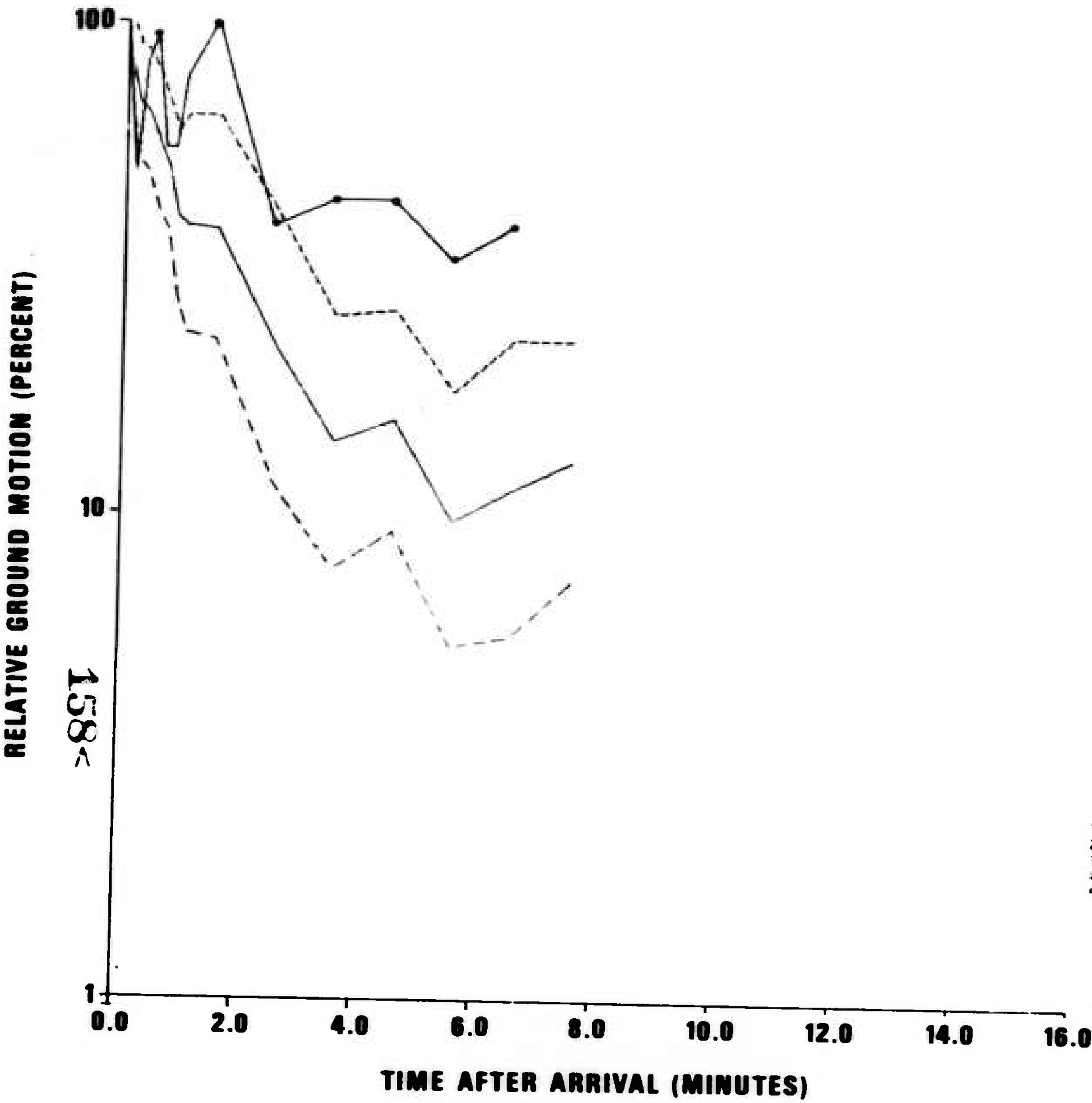
Figure AIV-8. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) SLM, 23.0°



TIME		AVG	STD DEV	OBS
0.0	S	76.	0.15	11.
10.0	S	77.	0.14	11.
20.0	S	67.	0.14	11.
30.0	S	56.	0.19	11.
40.0	S	51.	0.21	11.
50.0	S	50.	0.23	11.
1.0	M	39.	0.21	11.
1.5	M	32.	0.26	11.
2.5	M	18.	0.26	10.
3.5	M	17.	0.36	8.
4.5	M	19.	0.19	8.
5.5	M	11.	0.19	7.
6.5	M	10.	0.34	6.
7.5	M	12.	0.18	3.
8.5	M	14.	0.0	1.
9.5	M	11.	0.0	1.
10.5	M	9.	0.0	1.
11.5	M	9.	0.0	1.
12.5	M	8.	0.0	1.
13.5	M	6.	0.0	1.
14.5	M	4.	0.0	1.

TIME		AVG
0.0	S	100.
10.0	S	93.
20.0	S	59.
30.0	S	20.
40.0	S	26.
50.0	S	27.
1.0	M	21.
1.5	M	24.
2.5	M	10.
3.5	M	8.
4.5	M	4.
5.5	M	3.
6.5	M	5.

Figure AIV-9. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) TPM, 23.0°



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.09	6.
10.0 S	71.	0.12	6.
20.0 S	67.	0.12	6.
30.0 S	59.	0.14	6.
40.0 S	53.	0.13	6.
50.0 S	42.	0.18	6.
1.0 M	40.	0.23	6.
1.5 M	39.	0.23	6.
2.5 M	23.	0.28	6.
3.5 M	15.	0.26	5.
4.5 M	16.	0.22	5.
5.5 M	10.	0.26	5.
6.5 M	12.	0.30	4.
7.5 M	14.	0.24	3.

TIME	AVG
0.0 S	100
10.0 S	50.
20.0 S	93.
30.0 S	94
40.0 S	56.
50.0 S	56.
1.0 M	78.
1.5 M	100.
2.5 M	39
3.5 M	44
4.5 M	44
5.5 M	33
6.5 M	39.

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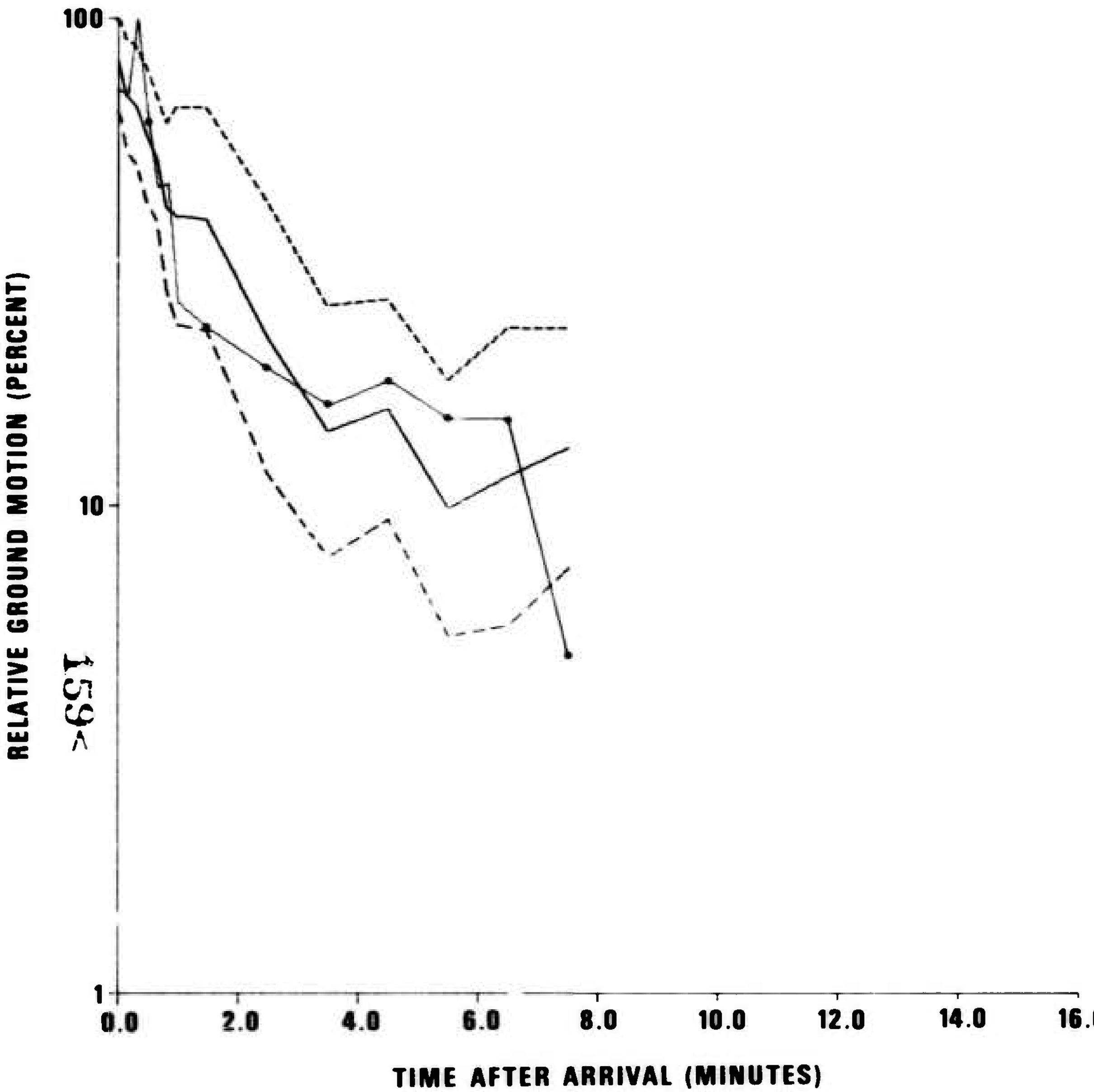
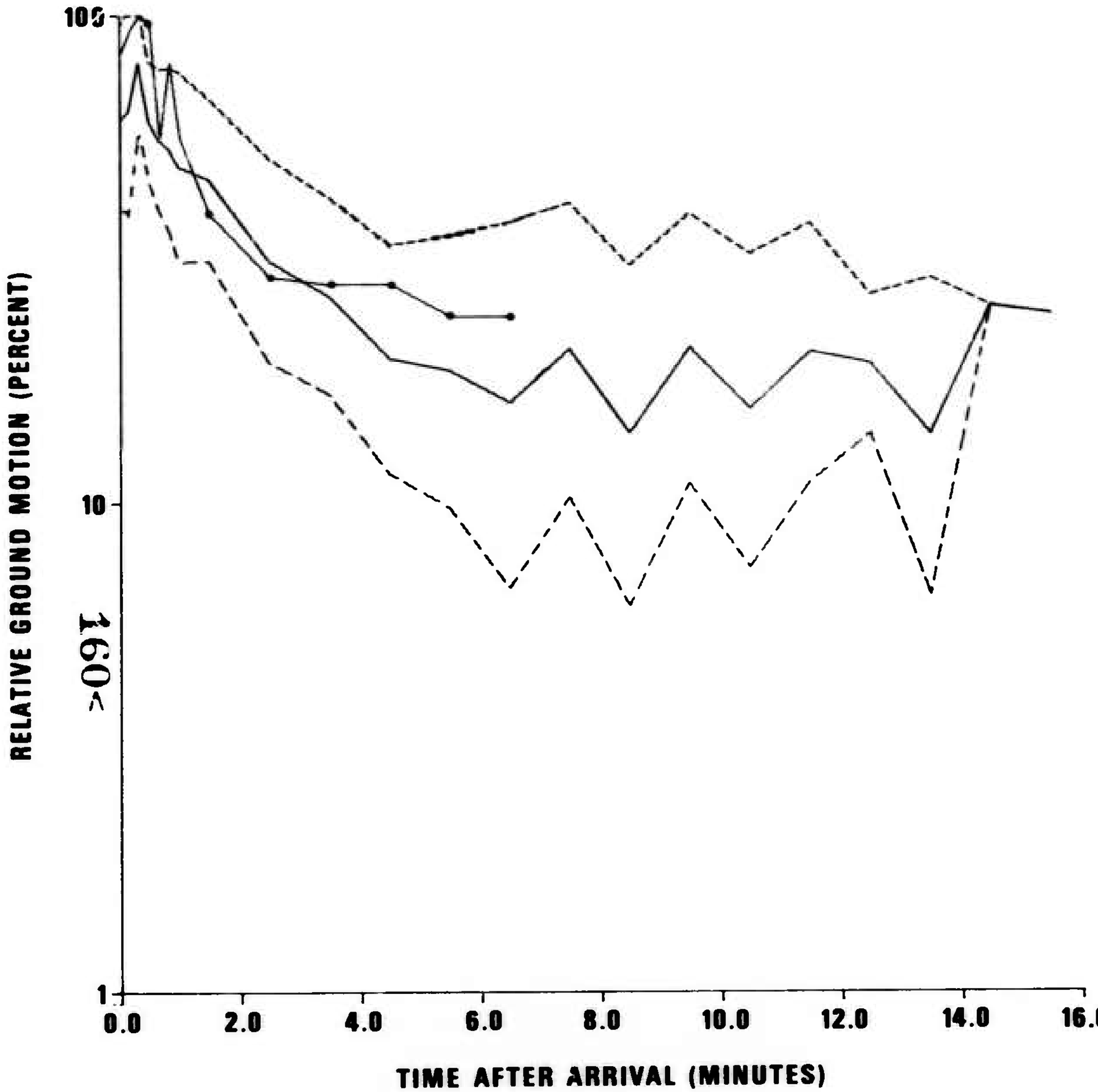
Figure AIV-10. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) CHI, 25.0°



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.09	6.
10.0 S	71.	0.12	6.
20.0 S	67.	0.12	6.
30.0 S	59.	0.14	6.
40.0 S	53.	0.13	6.
50.0 S	42.	0.18	6.
1.0 M	40.	0.23	6.
1.5 M	39.	0.23	6.
2.5 M	23.	0.28	6.
3.5 M	15.	0.26	5.
4.5 M	16.	0.27	5.
5.5 M	10.	0.26	5.
6.5 M	12.	0.30	4.
7.5 M	14.	0.24	3.

TIME	AVG
0.0 S	72.
10.0 S	70.
20.0 S	100.
30.0 S	63.
40.0 S	45.
50.0 S	46.
1.0 M	26.
1.5 M	23.
2.5 M	19.
3.5 M	16.
4.5 M	18.
5.5 M	15.
6.5 M	15.
7.5 M	5.

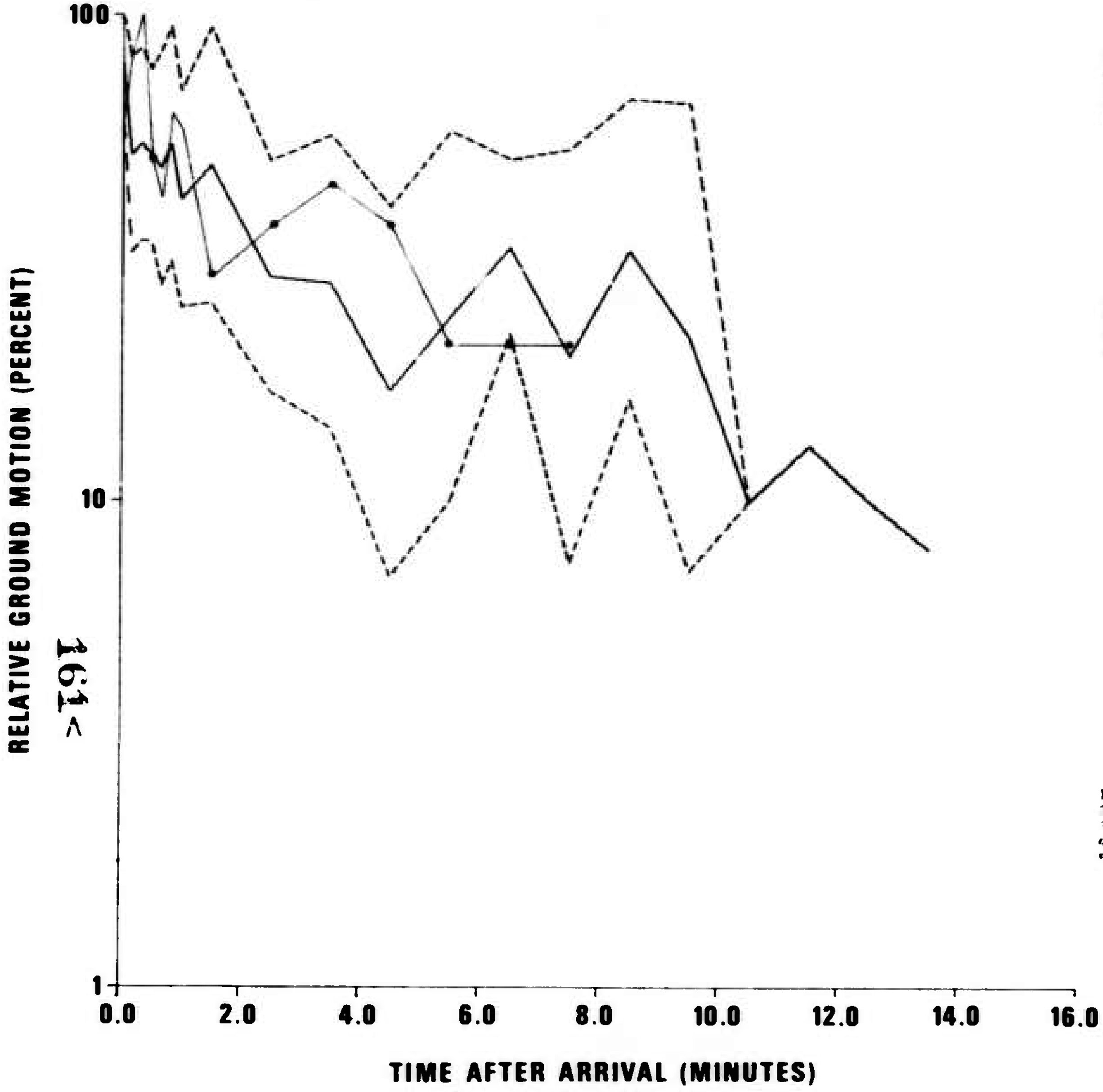
Figure AIV-11. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) LHC, 25.9°



TIME	AVG	STD DEV	OBS
0.0 S	62.	0.19	22.
10.0 S	65.	0.20	22.
20.0 S	81.	0.12	22.
30.0 S	61.	0.12	22.
40.0 S	56.	0.14	22.
50.0 S	54.	0.17	22.
1.0 M	49.	0.20	22.
1.5 M	47.	0.17	22.
2.5 M	32.	0.21	22.
3.5 M	27.	0.20	18.
4.5 M	20.	0.24	15.
5.5 M	19.	0.28	13.
6.5 M	16.	0.38	11.
7.5 M	21.	0.30	10.
8.5 M	14.	0.35	10.
9.5 M	21.	0.29	5.
10.5 M	16.	0.32	3.
11.5 M	21.	0.27	2.
12.5 M	19.	0.14	2.
13.5 M	14.	0.32	2.
14.5 M	26.	0.0	1.
15.5 M	25.	0.0	1.

TIME	AVG
0.0 S	83.
10.0 S	93.
20.0 S	100.
30.0 S	96.
40.0 S	56.
50.0 S	80.
1.0 M	56.
1.5 M	39.
2.5 M	29.
3.5 M	28.
4.5 M	28.
5.5 M	24.
6.5 M	24.

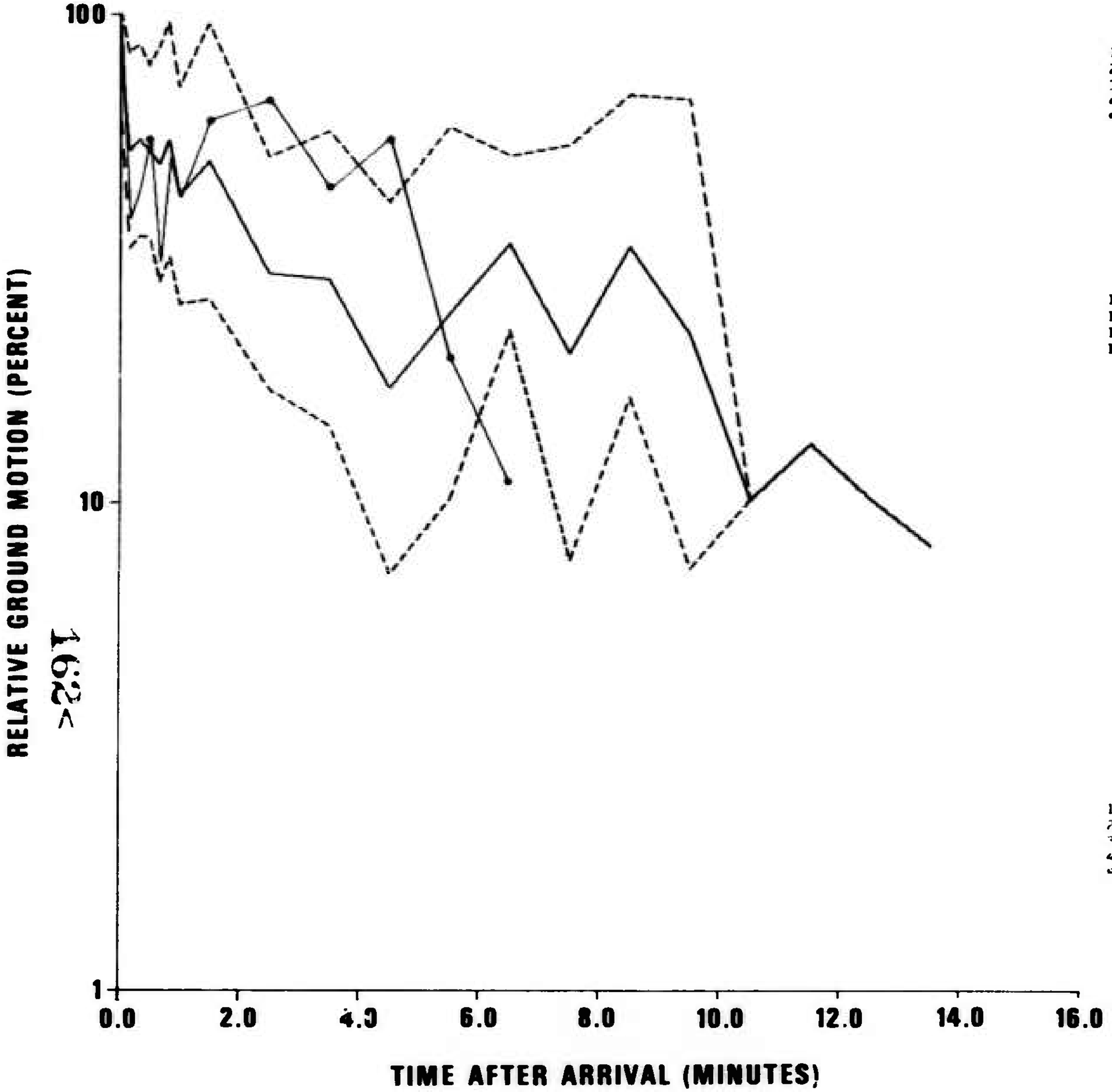
Figure AIV-12. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) YKC, 28.4°



TIME		AVG	STD DEV	OBS
0.0	S	88.	0.09	8.
10.0	S	53.	0.20	8.
20.0	S	56.	0.20	8.
30.0	S	53.	0.18	9.
40.0	S	50.	0.24	8.
50.0	S	56.	0.24	8.
1.0	M	43.	0.22	8.
1.5	M	50.	0.28	8.
2.5	M	30.	0.24	8.
3.5	M	29.	0.30	6.
4.5	M	18.	0.39	4.
5.5	M	25.	0.39	3.
6.5	M	24.	0.19	3.
7.5	M	21.	0.43	3.
8.5	M	34.	0.31	2.
9.5	M	22.	0.48	2.
10.5	M	11.	0.0	1.
11.5	M	14.	0.0	1.
12.5	M	11.	0.0	1.
13.5	M	9.	0.0	1.

TIME		AVG
0.0	S	60.
10.0	S	44
20.0	S	100
30.0	S	50
40.0	S	42.
50.0	S	63
1.0	M	58
1.5	M	29.
2.5	M	37
3.5	M	45
4.5	M	37
5.5	M	21
6.5	M	21
7.5	M	21

Figure AIV-13. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) FCC, 29.4°



TIME	AVG	STD DEV	OBS
0.0 S	88.	0.09	8.
10.0 S	53.	0.20	8.
20.0 S	56.	0.20	8.
30.0 S	53.	0.18	8.
40.0 S	50.	0.24	8.
50.0 S	56.	0.24	8.
1.0 M	43.	0.27	8.
1.5 M	50.	0.28	8.
2.5 M	30.	0.24	8.
3.5 M	29.	0.30	6.
4.5 M	18.	0.38	4.
5.5 M	25.	0.38	3.
6.5 M	34.	0.19	3.
7.5 M	21.	0.43	3.
8.5 M	34.	0.31	2.
9.5 M	22.	0.48	2.
10.5 M	11.	0.0	1.
11.5 M	14.	0.0	1.
12.5 M	11.	0.0	1.
13.5 M	9.	0.0	1.

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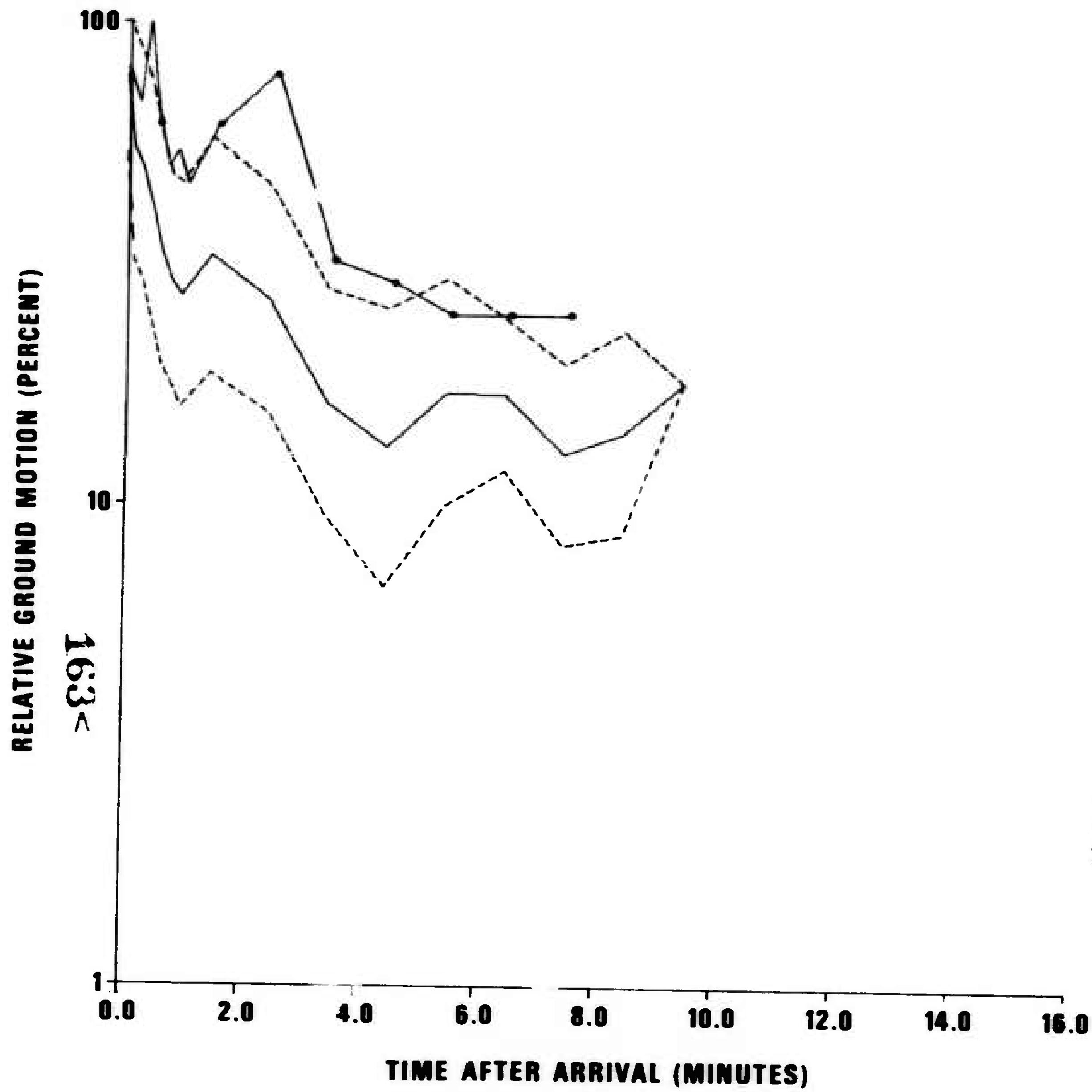
TIME	AVG
0.0 S	100.
10.0 S	38.
20.0 S	44.
30.0 S	56.
40.0 S	31.
50.0 S	51.
1.0 M	42.
1.5 M	61.
2.5 M	67.
3.5 M	44.
4.5 M	56.
5.5 M	20.
6.5 M	11.

Figure AIV-14. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) SUD, 30.7°



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.11	34.
10.0 S	55.	0.23	34.
20.0 S	50.	0.23	34.
30.0 S	41.	0.24	34.
40.0 S	34.	0.23	34.
50.0 S	30.	0.21	34.
1.0 M	28.	0.23	34.
1.5 M	33.	0.24	34.
2.5 M	27.	0.23	30.
3.5 M	17.	0.24	27.
4.5 M	14.	0.29	18.
5.5 M	18.	0.24	13.
6.5 M	17.	0.16	10.
7.5 M	13.	0.19	6.
8.5 M	15.	0.21	2.
9.5 M	19.	0.0	1.

TIME	AVG
0.0 S	79
10.0 S	68.
20.0 S	100.
30.0 S	64.
40.0 S	50.
50.0 S	54.
1.0 M	46.
1.5 M	61.
2.5 M	79.
3.5 M	32.
4.5 M	29
5.5 M	24
6.5 M	25
7.5 M	25.

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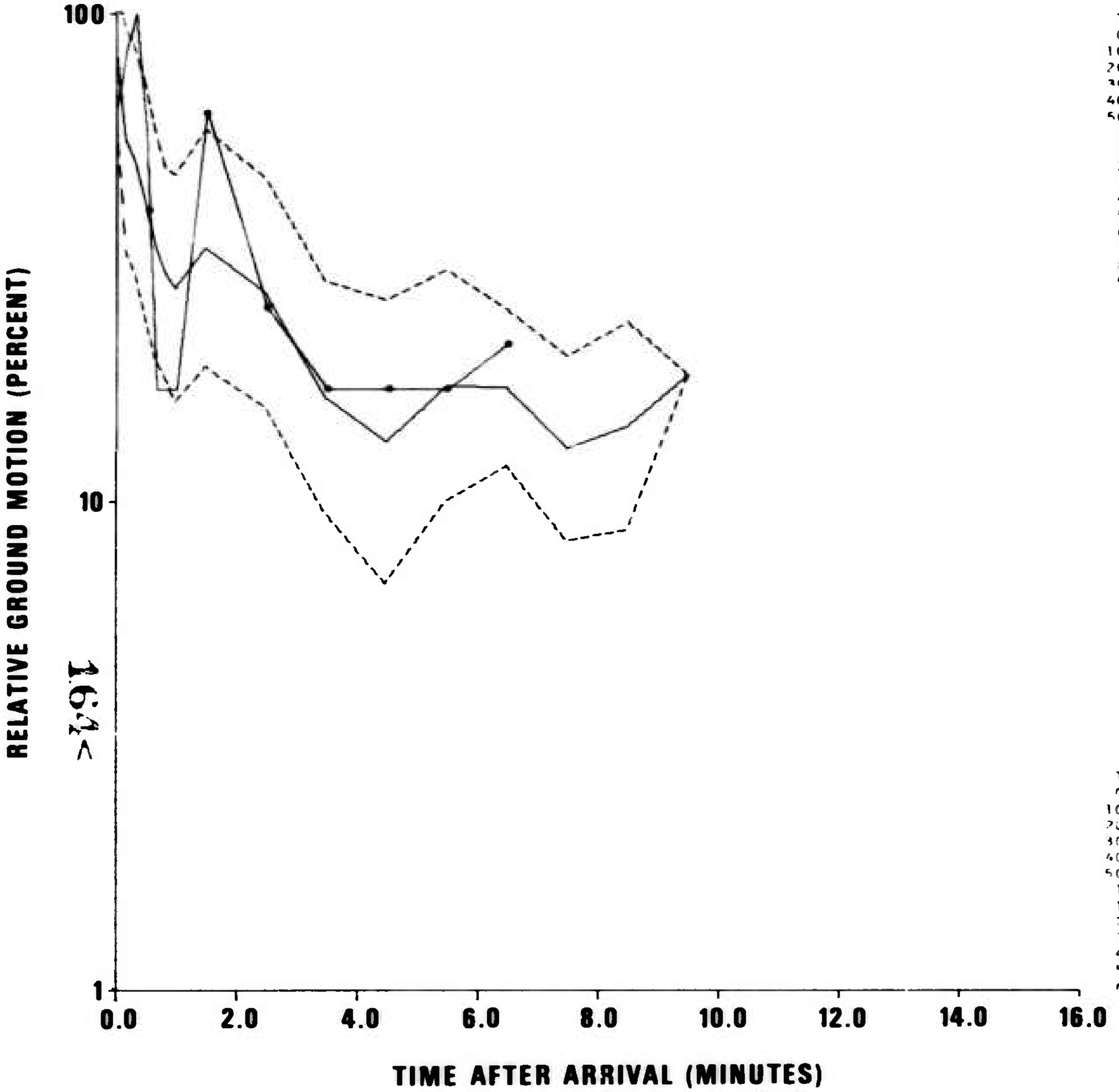
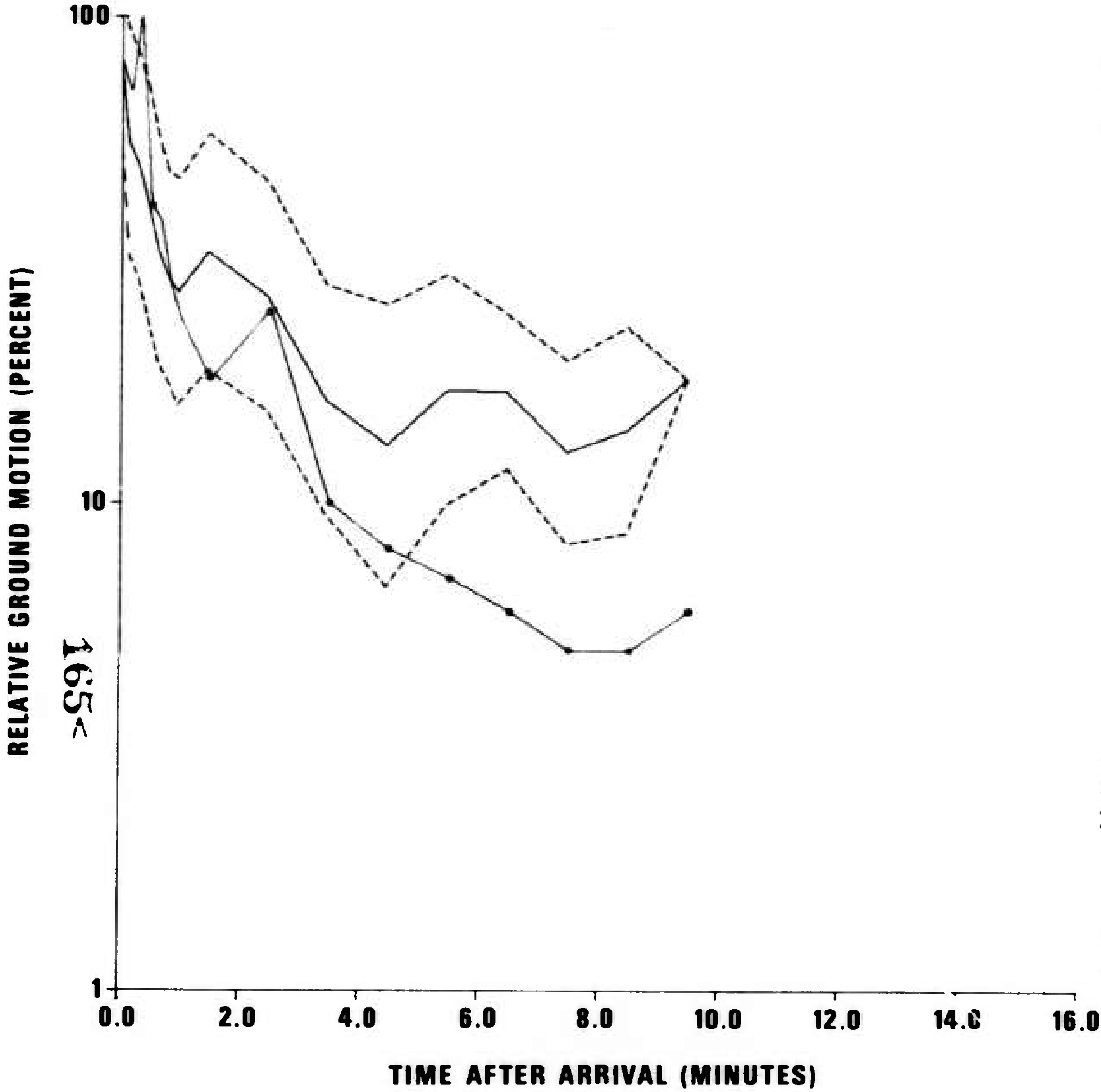
Figure AIV-15. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) BLC, 33.1°



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.11	34.
10.0 S	55.	0.23	34.
20.0 S	50.	0.23	34.
30.0 S	41.	0.24	34.
40.0 S	34.	0.23	34.
50.0 S	30.	0.21	34.
1.0 M	28.	0.23	34.
1.5 M	33.	0.24	34.
2.5 M	27.	0.23	30.
3.5 M	17.	0.24	27.
4.5 M	14.	0.29	18.
5.5 M	18.	0.24	13.
6.5 M	17.	0.16	10.
7.5 M	13.	0.19	6.
8.5 M	15.	0.21	2.
9.5 M	19.	0.0	1.

TIME	AVG
0.0 S	63.
10.0 S	83.
20.0 S	100.
30.0 S	58.
40.0 S	17.
50.0 S	17.
1.0 M	17.
1.5 M	63.
2.5 M	25.
3.5 M	17.
4.5 M	17.
5.5 M	17.
6.5 M	21.

Figure AIV-16. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) GEO, 33.2°

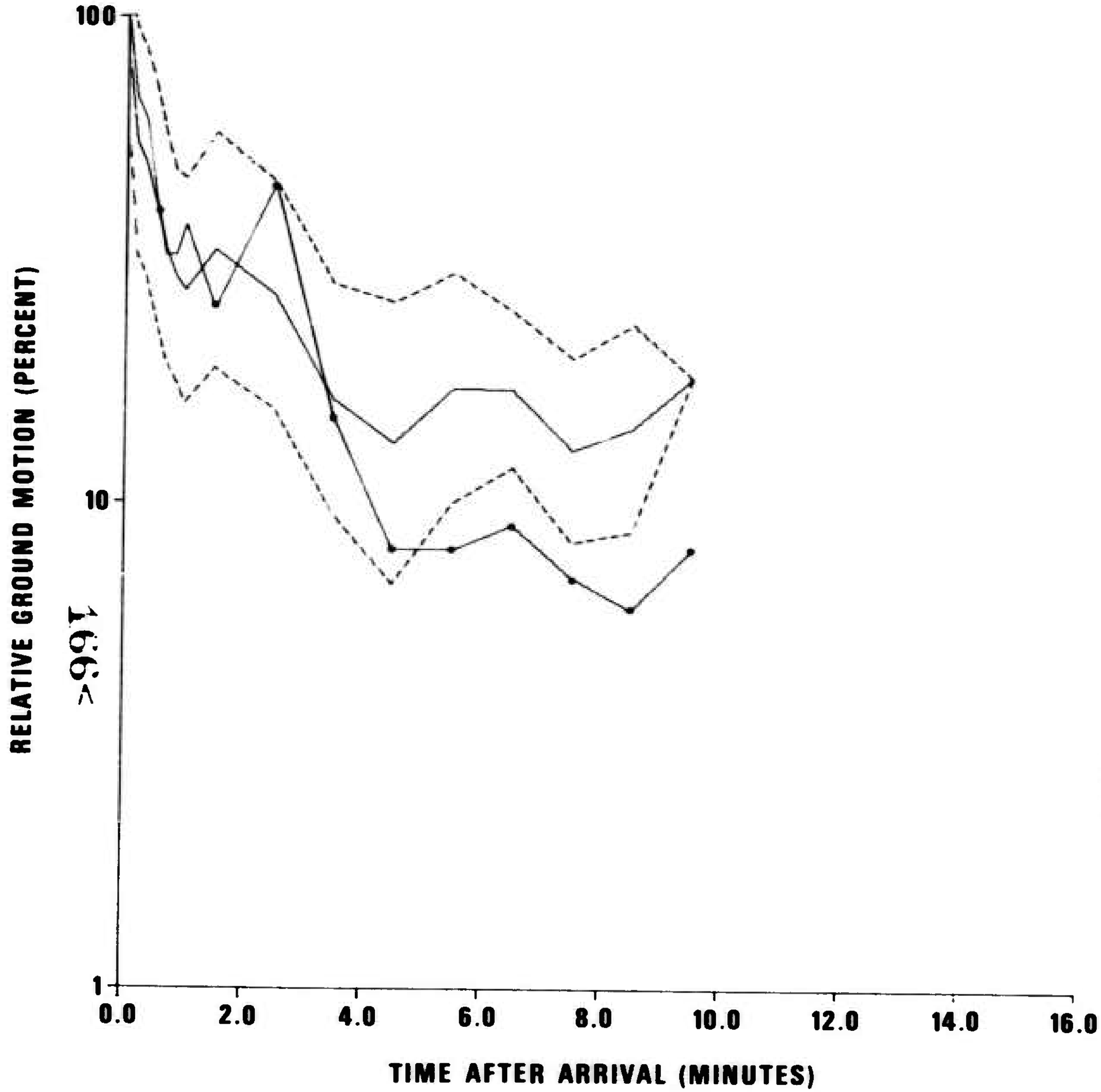


165<

TIME		AVG	STD DEV	OBS
0.0	S	87.	0.11	34.
10.0	S	55.	0.23	34.
20.0	S	50.	0.23	34.
30.0	S	41.	0.24	34.
40.0	S	34.	0.23	34.
50.0	S	30.	0.21	34.
1.0	M	28.	0.23	34.
1.5	M	33.	0.24	34.
2.5	M	27.	0.23	30.
3.5	M	17.	0.24	27.
4.5	M	14.	0.29	18.
5.5	M	18.	0.24	13.
6.5	M	17.	0.16	10.
7.5	M	13.	0.19	6.
8.5	M	15.	0.21	2.
9.5	M	19.	0.0	1.

TIME		AVG
0.0	S	81.
10.0	S	70.
20.0	S	100.
30.0	S	41.
40.0	S	38.
50.0	S	29.
1.0	M	24.
1.5	M	16.
2.5	M	25.
3.5	M	10.
4.5	M	8.
5.5	M	7.
6.5	M	6.
7.5	M	5.
8.5	M	5.
9.5	M	4.

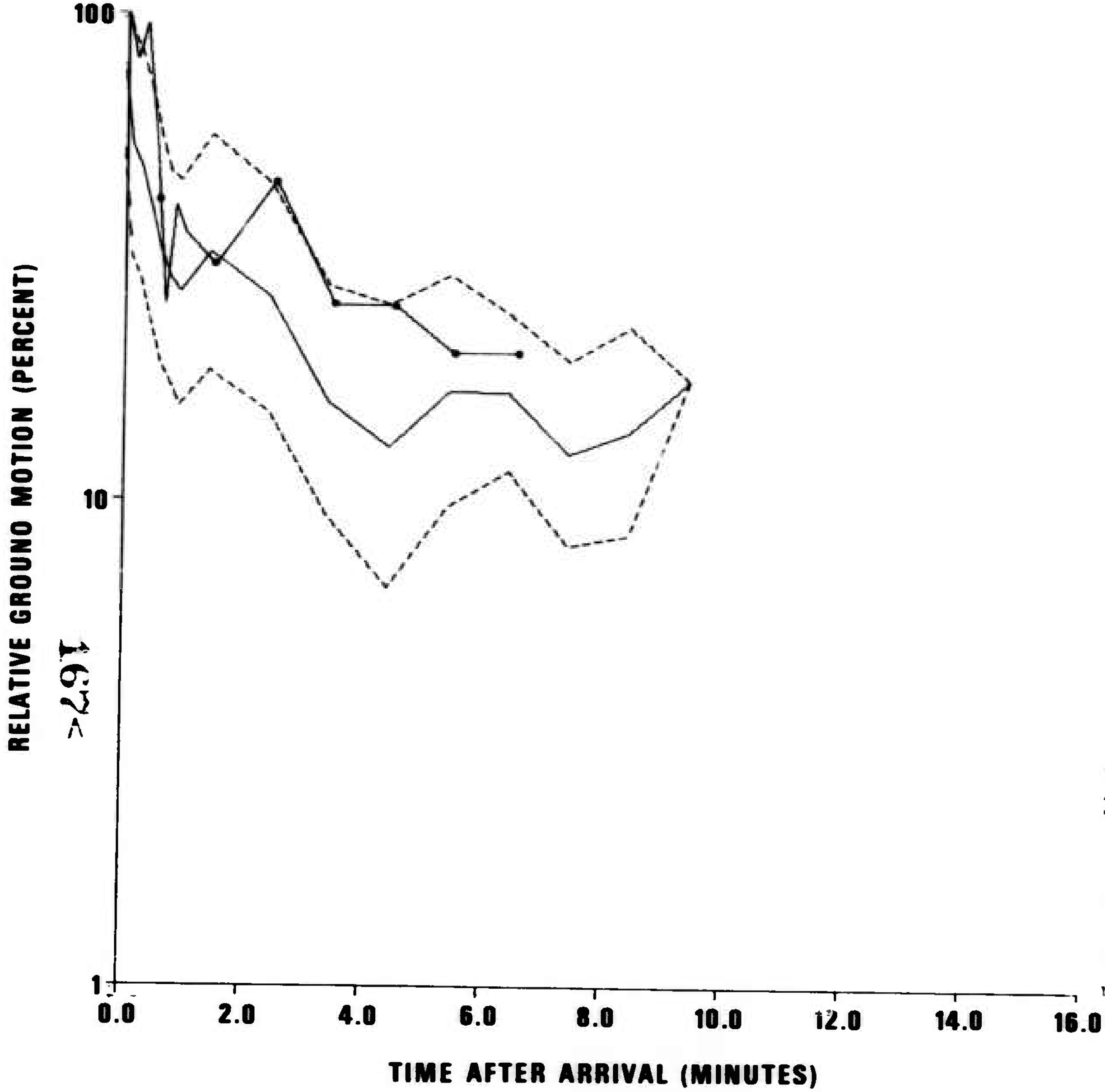
Figure AIV-17. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) INK, 35.1°



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.11	34.
10.0 S	55.	0.23	34.
20.0 S	50.	0.23	34.
30.0 S	41.	0.24	34.
40.0 S	34.	0.23	34.
50.0 S	30.	0.21	34.
1.0 M	28.	0.23	34.
1.5 M	33.	0.24	34.
2.5 M	27.	0.23	30.
3.5 M	17.	0.24	27.
4.5 M	14.	0.29	18.
5.5 M	18.	0.24	13.
6.5 M	17.	0.16	10.
7.5 M	13.	0.19	6.
8.5 M	15.	0.21	2.
9.5 M	19.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	68.
20.0 S	61.
30.0 S	42.
40.0 S	32.
50.0 S	32.
1.0 M	37.
1.5 M	25.
2.5 M	45.
3.5 M	15.
4.5 M	9.
5.5 M	8.
6.5 M	9.
7.5 M	7.
8.5 M	6.
9.5 M	8.

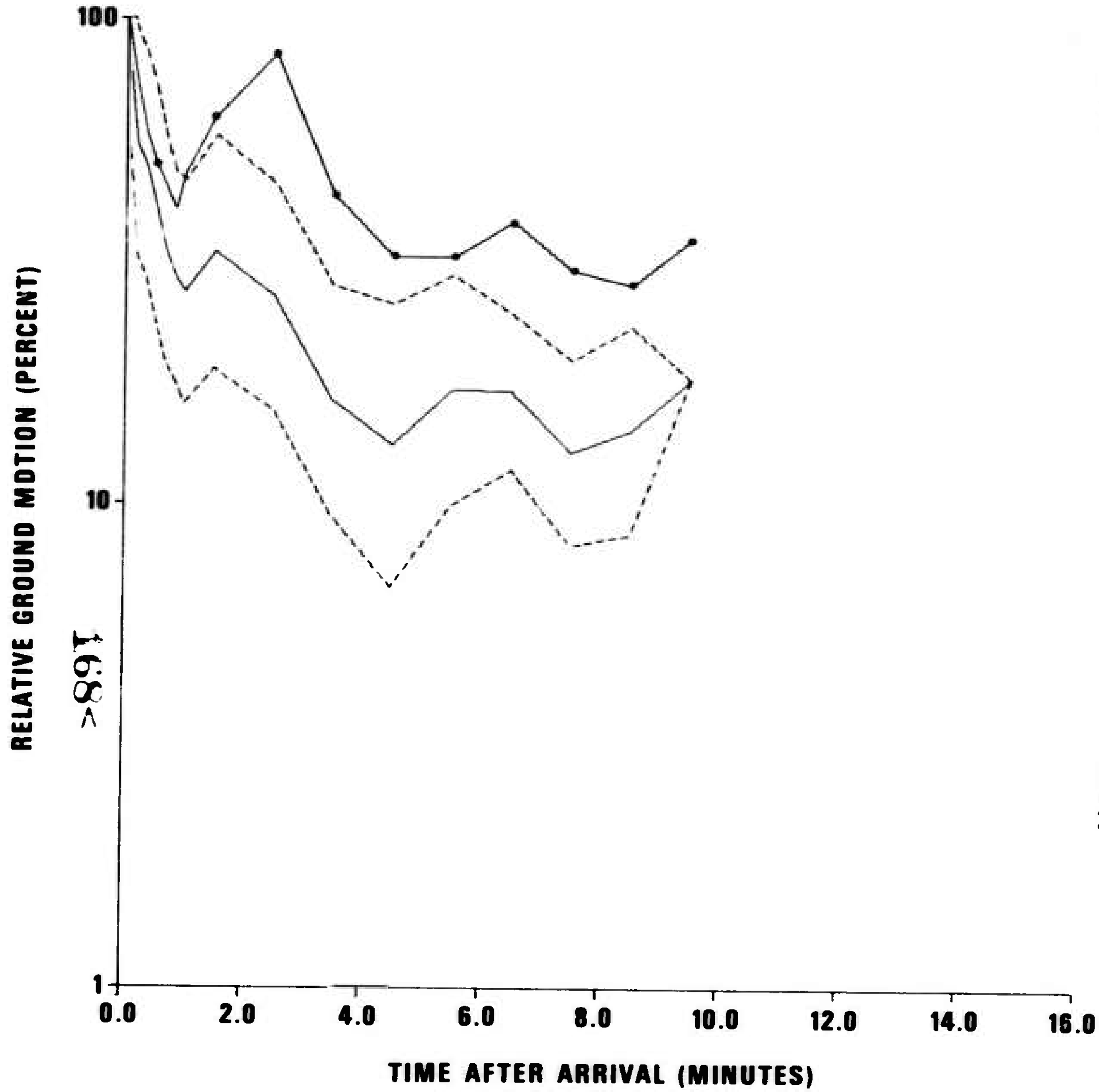
Figure AIV-18. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) COL, 35.4°



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.11	34.
10.0 S	55.	0.23	34.
20.0 S	50.	0.23	34.
30.0 S	41.	0.24	34.
40.0 S	34.	0.23	34.
50.0 S	30.	0.21	34.
1.0 M	28.	0.23	34.
1.5 M	33.	0.24	34.
2.5 M	27.	0.23	30.
3.5 M	17.	0.24	27.
4.5 M	14.	0.29	18.
5.5 M	18.	0.24	13.
6.5 M	17.	0.16	10.
7.5 M	13.	0.19	6.
8.5 M	15.	0.21	2.
9.5 M	19.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	80.
20.0 S	95.
30.0 S	55.
40.0 S	25.
50.0 S	40.
1.0 M	35.
1.5 M	30.
2.5 M	45.
3.5 M	25.
4.5 M	25.
5.5 M	20.
6.5 M	20.
7.5 M	20.
8.5 M	20.
9.5 M	20.
10.5 M	20.

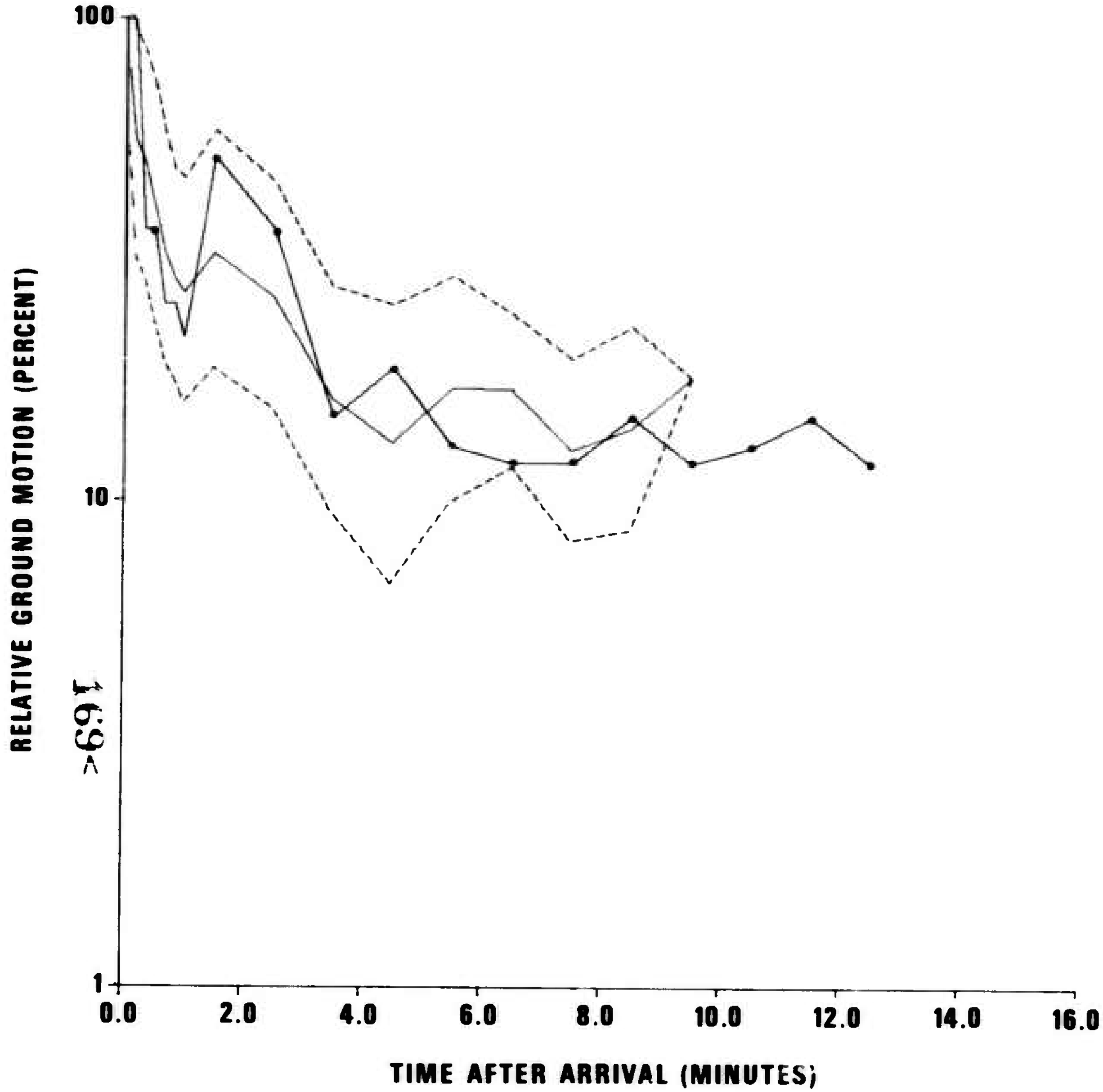
Figure AIV-19. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) KIP, 37.0°



TIME		AVG	STD DEV	OBS
0.0	S	87.	0.11	34.
10.0	S	55.	0.23	34.
20.0	S	50.	0.23	34.
30.0	S	41.	0.24	34.
40.0	S	34.	0.23	34.
50.0	S	30.	0.21	34.
1.0	M	28.	0.23	34.
1.5	M	33.	0.24	34.
2.5	M	27.	0.22	30.
3.5	M	17.	0.24	27.
4.5	M	14.	0.29	18.
5.5	M	18.	0.24	12.
6.5	M	17.	0.16	10.
7.5	M	13.	0.19	6.
8.5	M	15.	0.21	2.
9.5	M	19.	0.0	1.

TIME		AVG
0.0	S	100
10.0	S	75
20.0	S	58
30.0	S	50
40.0	S	45
50.0	S	40
1.0	M	48.
1.5	M	63
2.5	M	85.
3.5	M	43.
4.5	M	42.
5.5	M	32.
6.5	M	38
7.5	M	40.
8.5	M	28.
9.5	M	35

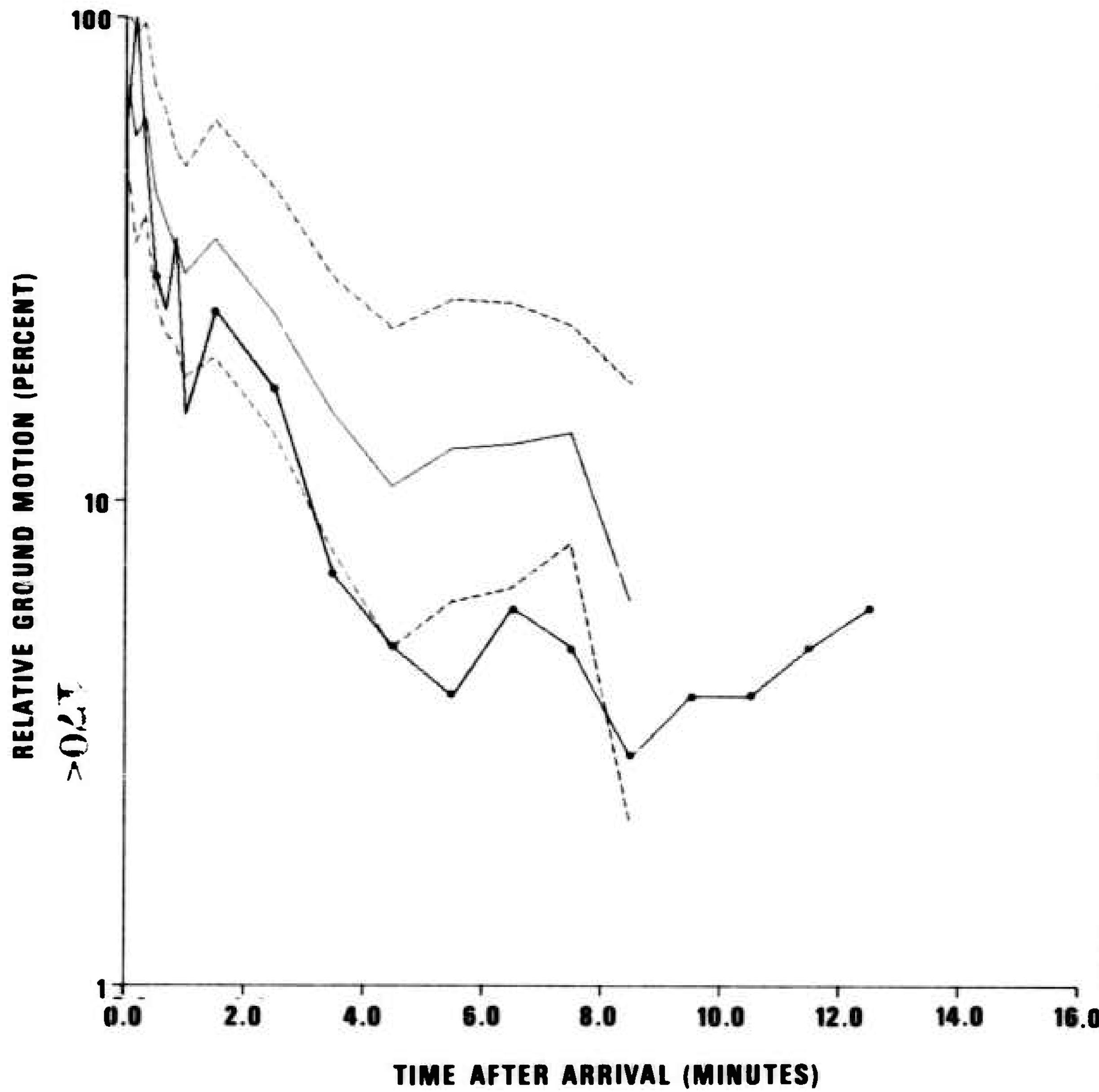
Figure AIV-20. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) SFA, 37.7°



TIME	AVG	STD DEV	OBS
0.0 S	87.	0.11	34.
10.0 S	55.	0.23	34.
20.0 S	50.	0.23	34.
30.0 S	41.	0.24	34.
40.0 S	34.	0.23	34.
50.0 S	30.	0.21	34.
1.0 M	28.	0.23	34.
1.5 M	34.	0.24	34.
2.5 M	27.	0.22	30.
3.5 M	17.	0.24	27.
4.5 M	14.	0.29	18.
5.5 M	18.	0.24	13.
6.5 M	17.	0.16	10.
7.5 M	13.	0.19	6.
8.5 M	15.	0.21	2.
9.5 M	19.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	99.
20.0 S	37.
30.0 S	37.
40.0 S	26.
50.0 S	26.
1.0 M	22.
1.5 M	51.
2.5 M	37.
3.5 M	15.
4.5 M	19.
5.5 M	13.
6.5 M	12.
7.5 M	12.
8.5 M	15.
9.5 M	12.
10.5 M	13.
11.5 M	15.
12.5 M	12.

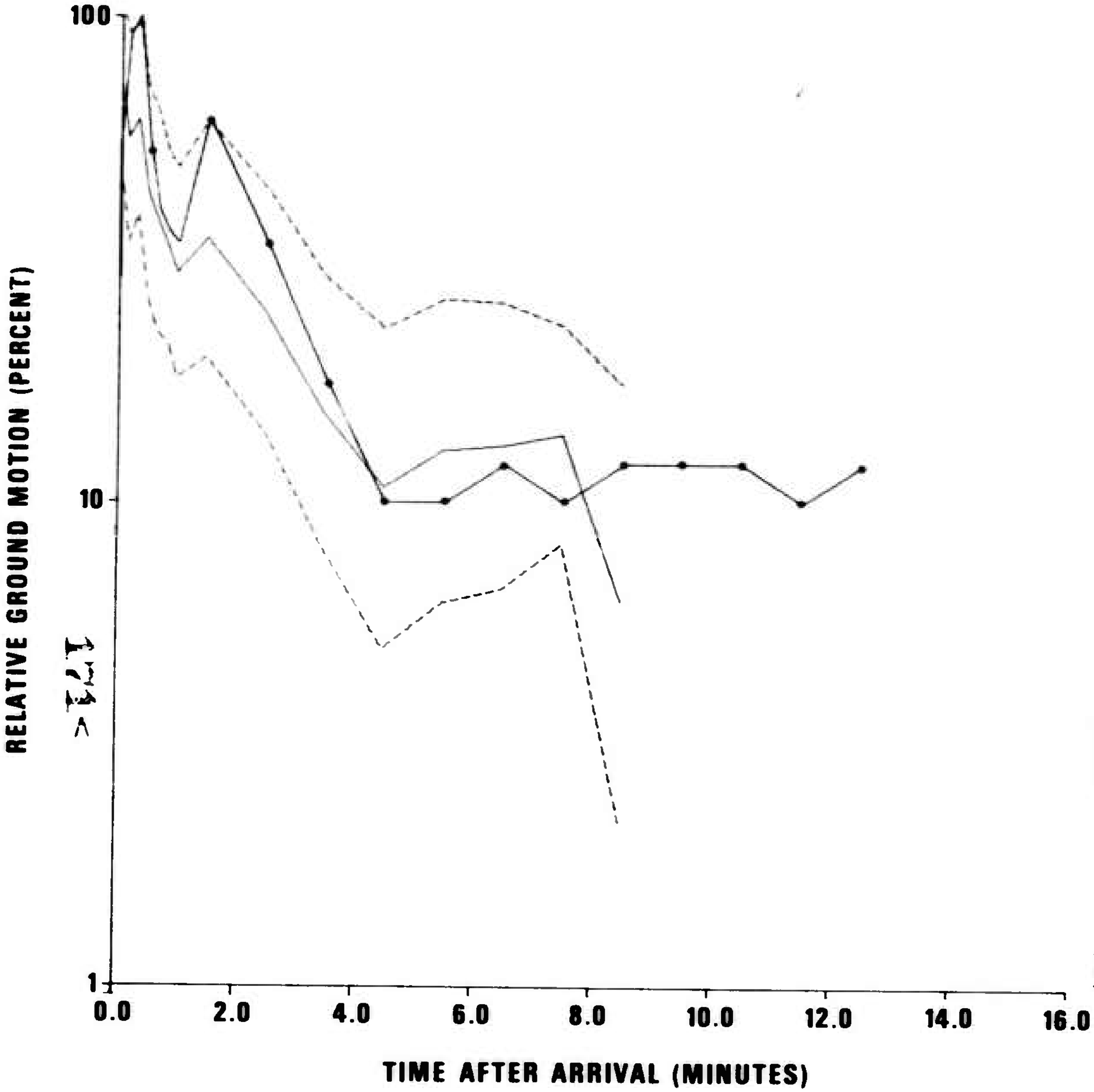
Figure AIV-21. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) SCH, 40.9°



TIME	AVG	STD DEV	OBS
0.0 S	78.	0.15	44.
10.0 S	57.	0.22	44.
20.0 S	62.	0.20	44.
30.0 S	44.	0.27	44.
40.0 S	38.	0.23	44.
50.0 S	34.	0.19	44.
1.0 M	30.	0.21	44.
1.5 M	35.	0.24	44.
2.5 M	25.	0.25	36.
3.5 M	16.	0.28	31.
4.5 M	11.	0.33	15.
5.5 M	13.	0.31	10.
6.5 M	14.	0.30	8.
7.5 M	14.	0.23	[illegible]
8.5 M	7.	0.45	2.

TIME	AVG
0.0 S	60.
10.0 S	100.
20.0 S	50.
30.0 S	23.
40.0 S	25.
50.0 S	35.
1.0 M	15.
1.5 M	25.
2.5 M	17.
3.5 M	7.
4.5 M	5.
5.5 M	4.
6.5 M	6.
7.5 M	5.
8.5 M	3.
9.5 M	4.
10.5 M	4.
11.5 M	5.
12.5 M	6.

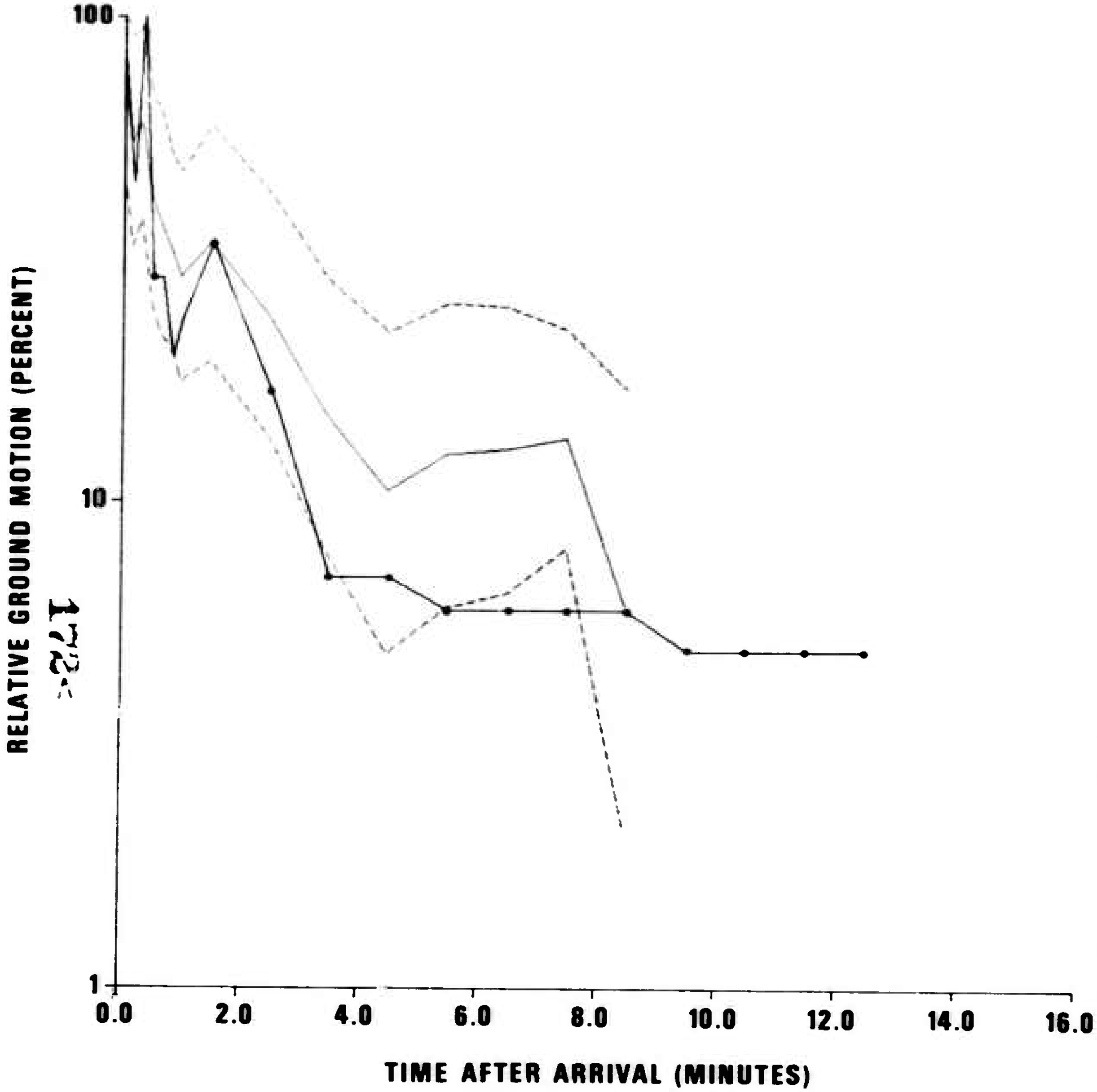
Figure AIV-22. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) MBC, 42.0°



TIME	AVG	STD DEV	OBS
0.0 S	78.	0.15	44.
10.0 S	57.	0.22	44.
20.0 S	62.	0.20	44.
30.0 S	44.	0.22	44.
40.0 S	38.	0.23	44.
50.0 S	34.	0.19	44.
1.0 M	30.	0.21	44.
1.5 M	35.	0.24	44.
2.5 M	25.	0.25	38.
3.5 M	16.	0.28	31.
4.5 M	11.	0.33	15.
5.5 M	13.	0.31	10.
6.5 M	14.	0.30	8.
7.5 M	14.	0.23	5.
8.5 M	7.	0.45	2.

TIME	AVG
0.0 S	54.
10.0 S	92.
20.0 S	100
30.0 S	56.
40.0 S	40
50.0 S	36
1.0 M	34.
1.5 M	62
2.5 M	34
3.5 M	19
4.5 M	10.
5.5 M	10.
6.5 M	12
7.5 M	10.
8.5 M	12.
9.5 M	12.
10.5 M	12.
11.5 M	10.
12.5 M	12.

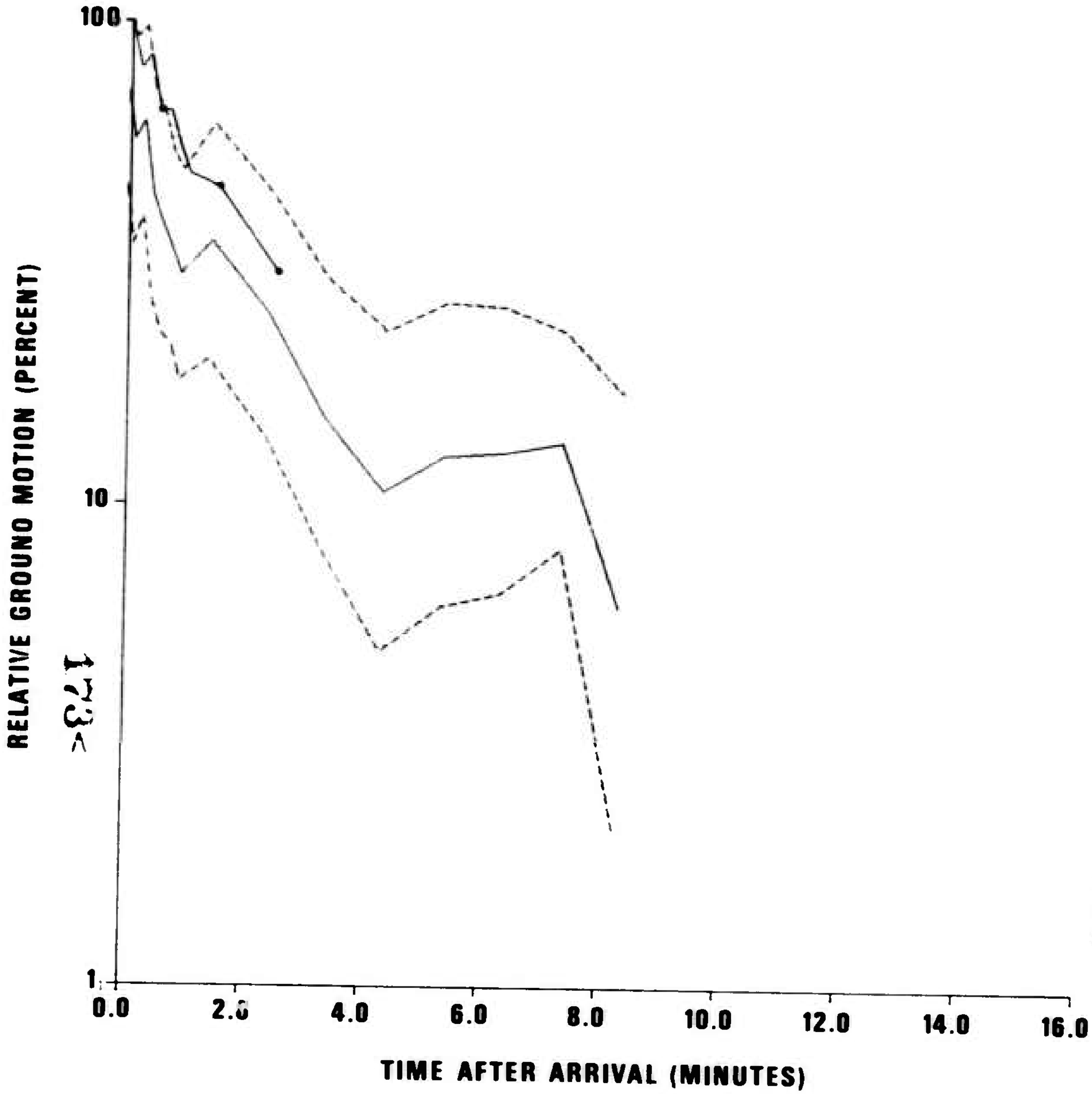
Figure AIV-23. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) RES, 42.0°



TIME		AVG	STD DEV	OBS
0.0	S	78.	0.15	44.
10.0	S	57.	0.22	44.
20.0	S	62.	0.20	44.
30.0	S	44.	0.22	44.
40.0	S	38.	0.23	44.
50.0	S	34.	0.19	44.
1.0	M	30.	0.21	44.
1.5	M	35.	0.24	44.
2.5	M	25.	0.25	38.
3.5	M	16.	0.28	31.
4.5	M	11.	0.33	15.
5.5	M	13.	0.31	10.
6.5	M	14.	0.30	8.
7.5	M	14.	0.23	5.
8.5	M	7.	0.45	2.

TIME		AVG
0.0	S	92.
10.0	S	45.
20.0	S	100.
30.0	S	29.
40.0	S	29.
50.0	S	22.
1.0	M	24.
1.5	M	34.
2.5	M	17.
3.5	M	7.
4.5	M	7.
5.5	M	6.
6.5	M	6.
7.5	M	6.
8.5	M	6.
9.5	M	5.
10.5	M	5.
11.5	M	5.
12.5	M	5.

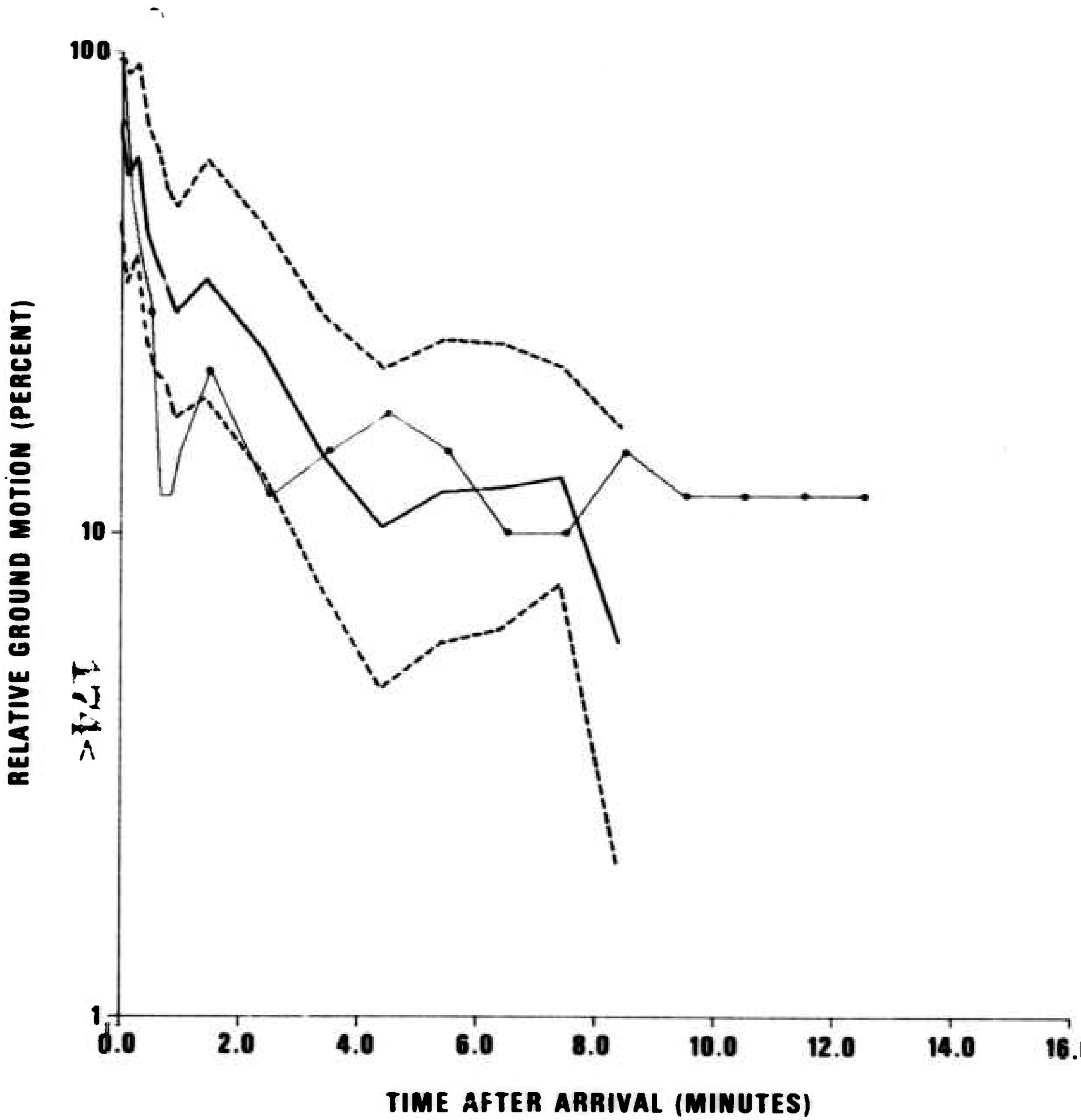
Figure AIV-24. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) FBC, 42.3°



TIME	AVG	STD DEV	OBS
0.0 S	78.	0.15	44.
10.0 S	57.	0.22	44.
20.0 S	62.	0.20	44.
30.0 S	44.	0.22	44.
40.0 S	38.	0.23	44.
50.0 S	34.	0.19	44.
1.0 M	30.	0.21	44.
1.5 M	35.	0.24	44.
2.5 M	25.	0.25	36.
3.5 M	16.	0.28	31.
4.5 M	11.	0.33	15.
5.5 M	13.	0.31	10.
6.5 M	14.	0.30	8.
7.5 M	14.	0.23	5.
8.5 M	7.	0.45	2.

TIME	AVG
0.0 S	100.
10.0 S	80.
20.0 S	85.
30.0 S	65.
40.0 S	65.
50.0 S	55.
1.0 M	49.
1.5 M	45.
2.5 M	30.

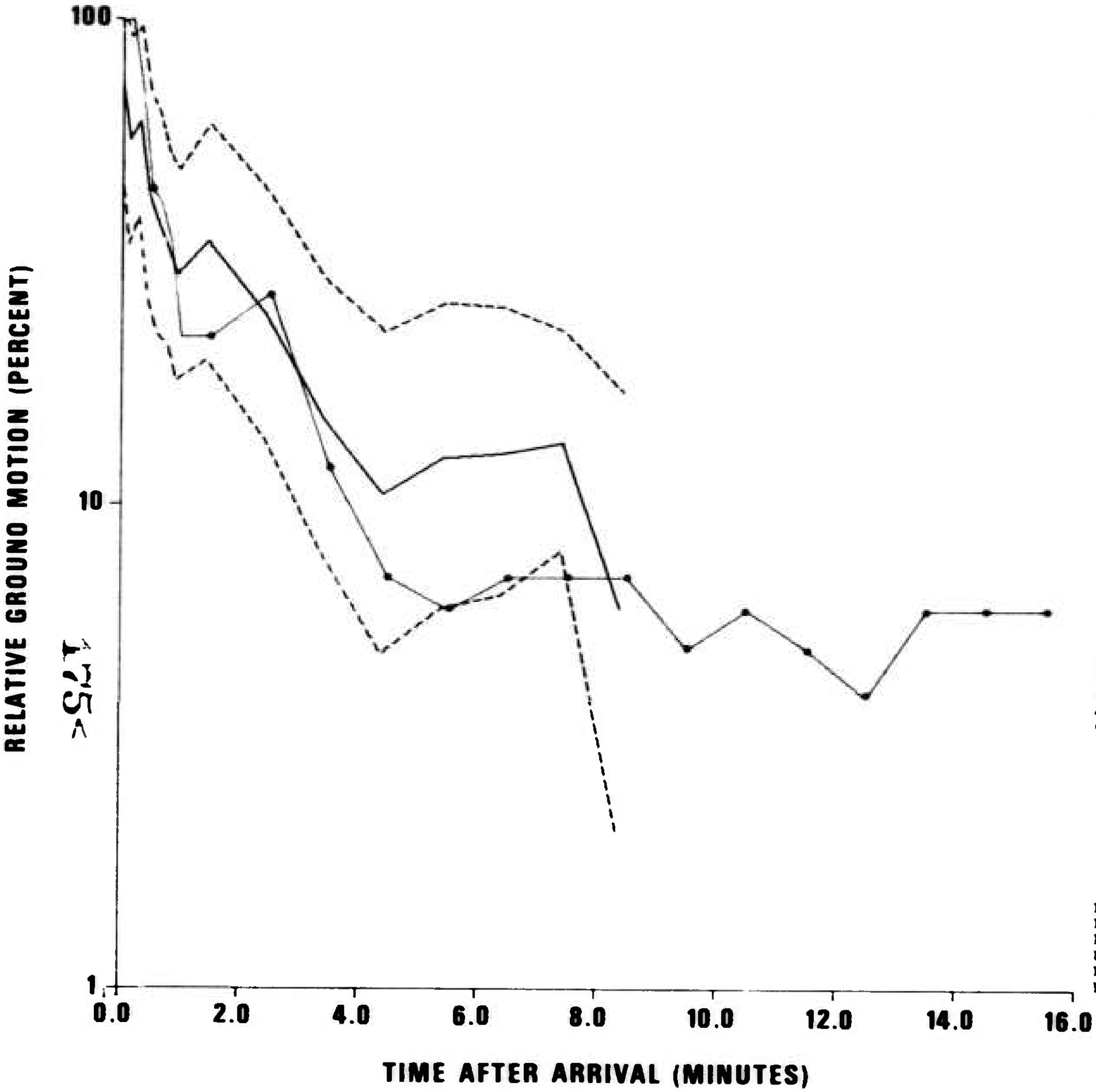
Figure AIV-25. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) BHP, 43.6°



TIME		AVG	STD DEV	OBS
0.0	S	78.	0.15	44.
10.0	S	57.	0.22	44.
20.0	S	62.	0.20	44.
30.0	S	44.	0.22	44.
40.0	S	38.	0.23	44.
50.0	S	34.	0.19	44.
1.0	M	20.	0.21	44.
1.5	M	35.	0.24	44.
2.5	M	25.	0.25	38.
3.5	M	16.	0.28	31.
4.5	M	11.	0.33	15.
5.5	M	13.	0.31	10.
6.5	M	14.	0.30	8.
7.5	M	14.	0.23	5.
8.5	M	7.	0.45	2.

TIME		AVG
0.0	S	100.
10.0	S	49.
20.0	S	37.
30.0	S	30.
40.0	S	12.
50.0	S	12.
1.0	M	15.
1.5	M	22.
2.5	M	12.
3.5	M	15.
4.5	M	18.
5.5	M	15.
6.5	M	10.
7.5	M	10.
8.5	M	15.
9.5	M	12.
10.5	M	12.
11.5	M	12.
12.5	M	12.

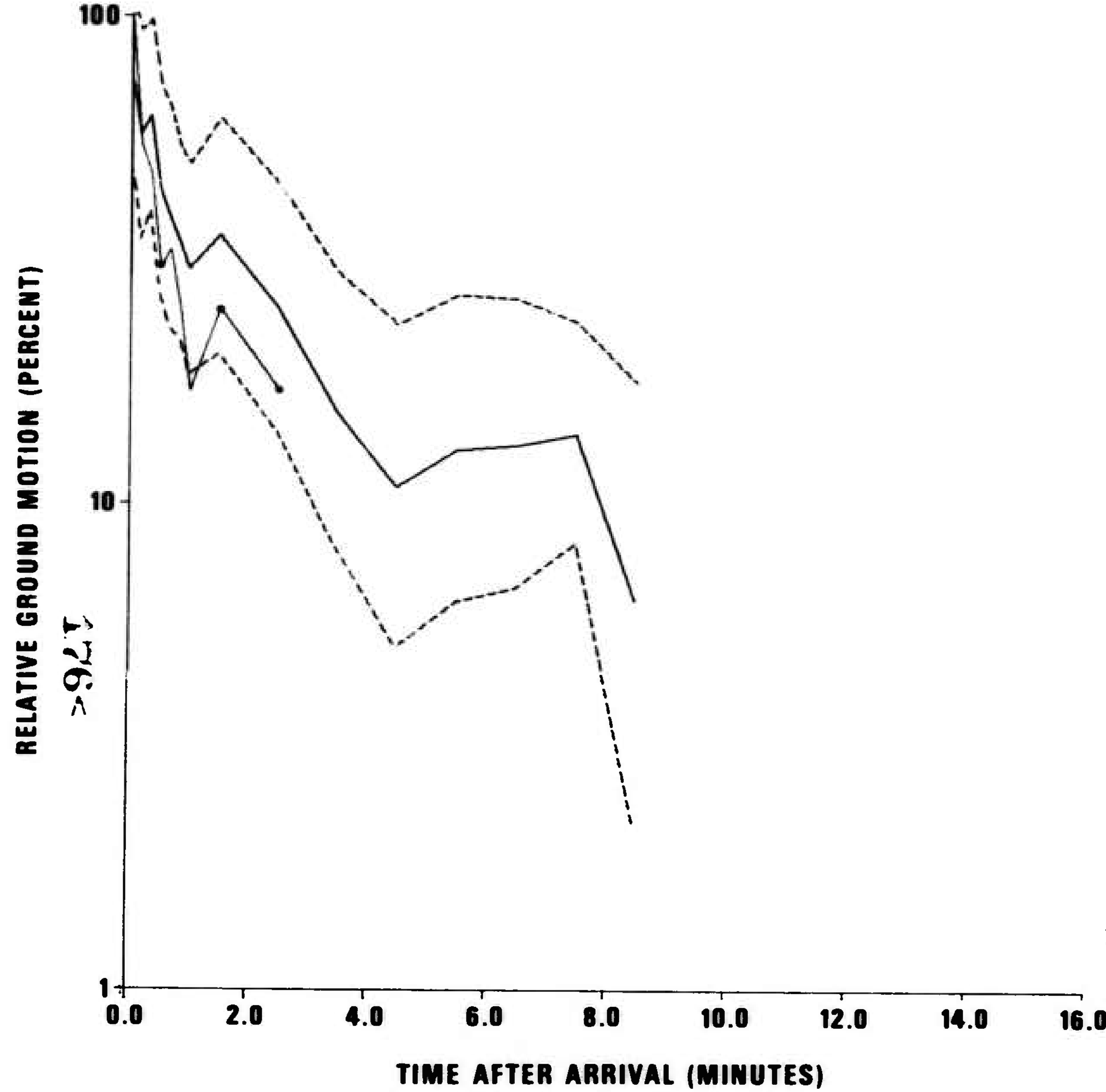
Figure AIV-26. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) STJ, 49.8°



TIME	AVG	STD DEV	OBS
0.0 S	78.	0.15	44.
10.0 S	57.	0.22	44.
20.0 S	62.	0.20	44.
30.0 S	44.	0.22	44.
40.0 S	38.	0.23	44.
50.0 S	34.	0.19	44.
1.0 M	30.	0.21	44.
1.5 M	35.	0.24	44.
2.5 M	25.	0.25	38.
3.5 M	16.	0.28	31.
4.5 M	11.	0.33	15.
5.5 M	13.	0.31	10.
6.5 M	14.	0.30	8.
7.5 M	14.	0.23	5.
8.5 M	7.	0.45	2.

TIME	AVG
0.0 S	93.
10.0 S	100.
20.0 S	73.
30.0 S	44.
40.0 S	41.
50.0 S	34.
1.0 M	22.
1.5 M	22.
2.5 M	27.
3.5 M	12.
4.5 M	7.
5.5 M	6.
6.5 M	7.
7.5 M	7.
8.5 M	7.
9.5 M	5.
10.5 M	6.
11.5 M	5.
12.5 M	4.
13.5 M	6.
14.5 M	6.
15.5 M	6.

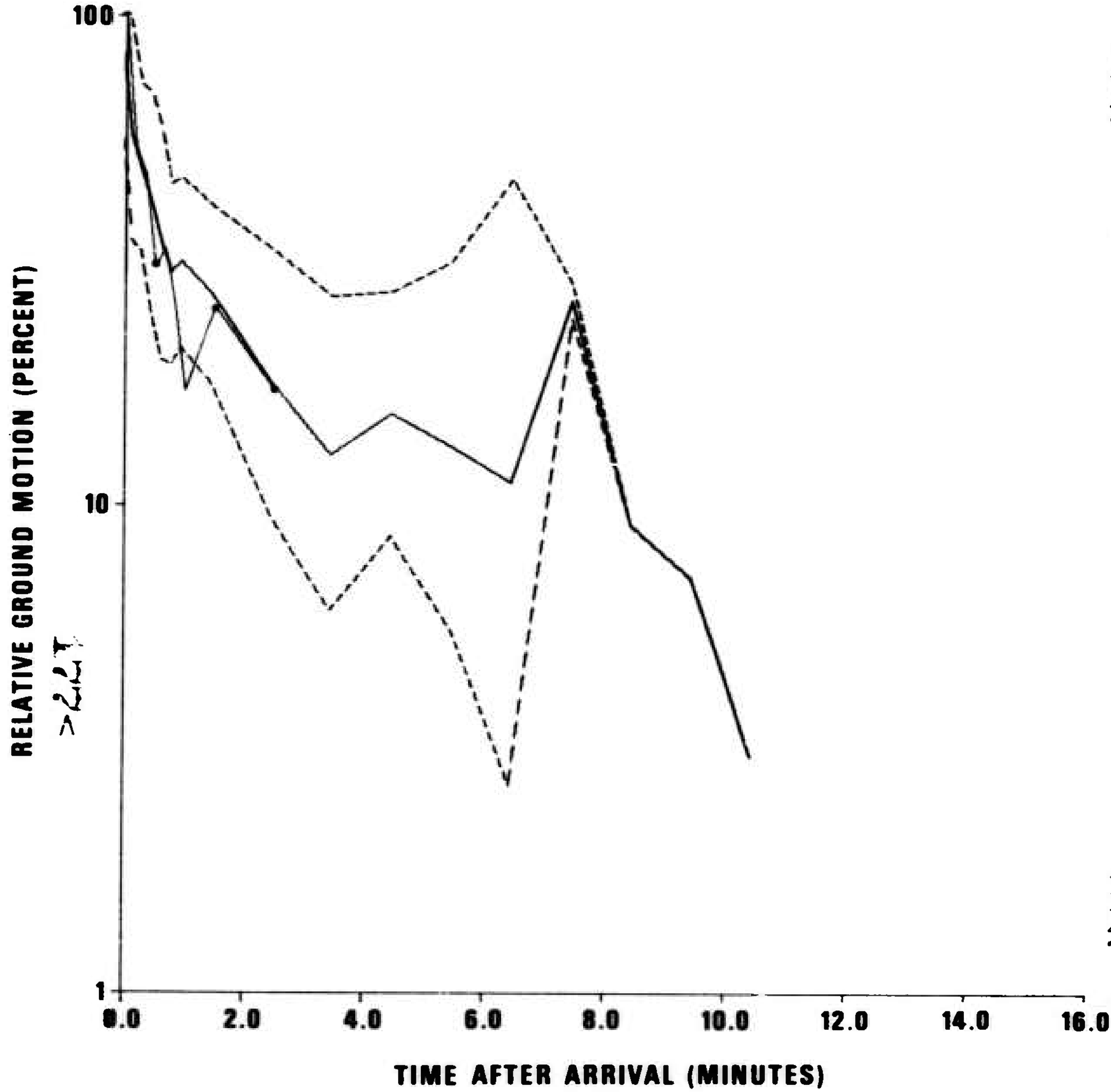
Figure AIV-27. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) ALE, 51.8°



TIME	AVG	STD DEV	OBS
0.0 S	78.	0.15	44.
10.0 S	57.	0.22	44.
20.0 S	62.	0.20	44.
30.0 S	44.	0.22	44.
40.0 S	38.	0.23	44.
50.0 S	34.	0.19	44.
1.0 M	30.	0.21	44.
1.5 M	35.	0.24	44.
2.5 M	25.	0.25	38.
3.5 M	16.	0.28	31.
4.5 M	11.	0.33	15.
5.5 M	13.	0.31	10.
6.5 M	14.	0.30	8.
7.5 M	14.	0.23	5.
8.5 M	7.	0.45	2.

TIME	AVG
0.0 S	100.
10.0 S	54.
20.0 S	47.
30.0 S	30.
40.0 S	33.
50.0 S	25.
1.0 M	17.
1.5 M	25.
2.5 M	17.

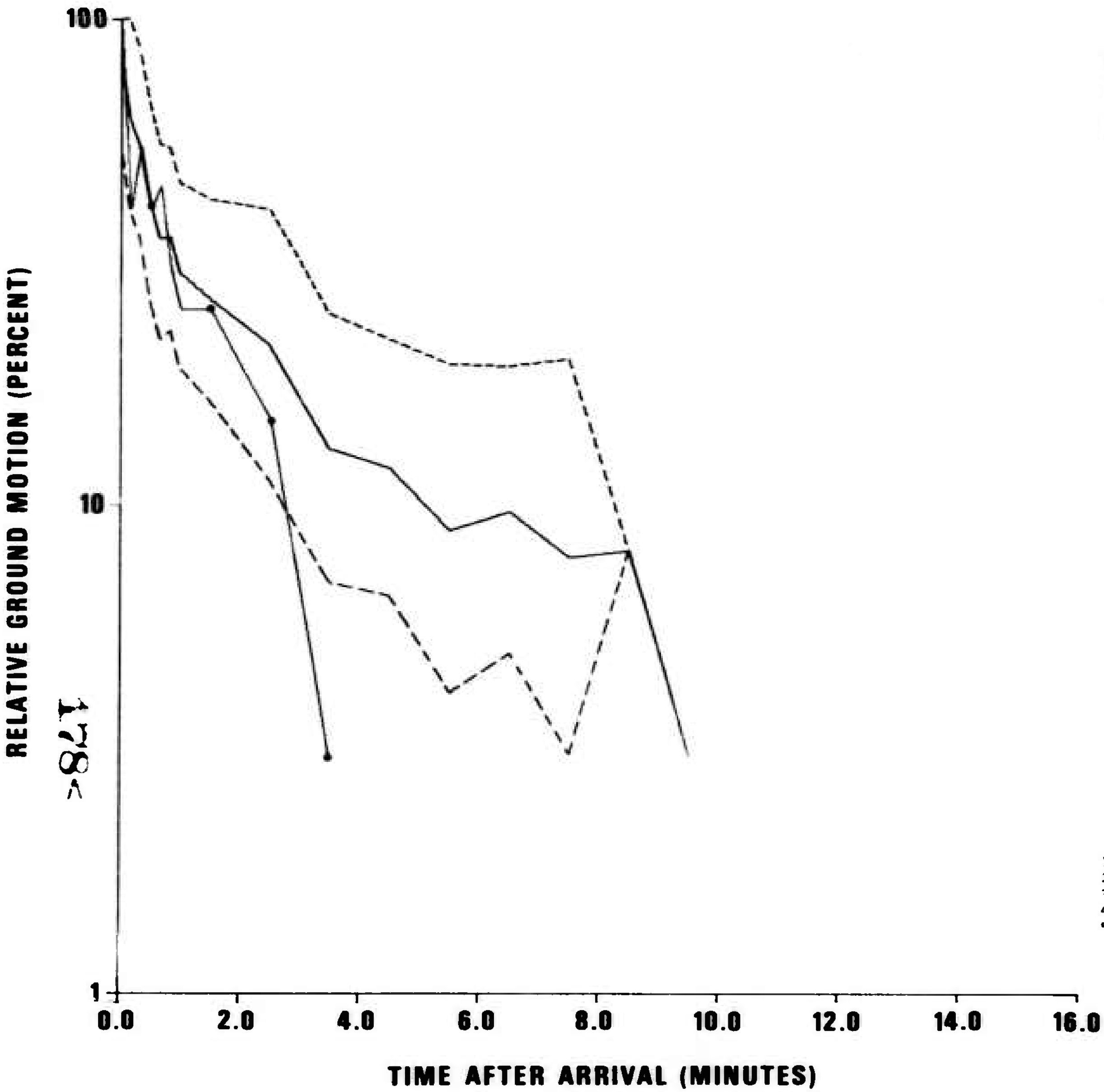
Figure AIV-28. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) CAR, 52.5°



TIME	AVG	STD DEV	OBS
0.0 S	78.	0.15	44.
10.0 S	57.	0.22	44.
20.0 S	62.	0.20	44.
30.0 S	44.	0.22	44.
40.0 S	38.	0.23	44.
50.0 S	34.	0.19	44.
1.0 M	30.	0.21	44.
1.5 M	35.	0.24	44.
2.5 M	25.	0.25	38.
3.5 M	16.	0.28	31.
4.5 M	11.	0.33	15.
5.5 M	13.	0.31	10.
6.5 M	14.	0.30	8.
7.5 M	14.	0.23	5.
8.5 M	7.	0.45	2.

TIME	AVG
0.0 S	100.
10.0 S	54.
20.0 S	47.
30.0 S	30.
40.0 S	33.
50.0 S	25.
1.0 M	17.
1.5 M	25.
2.5 M	17.

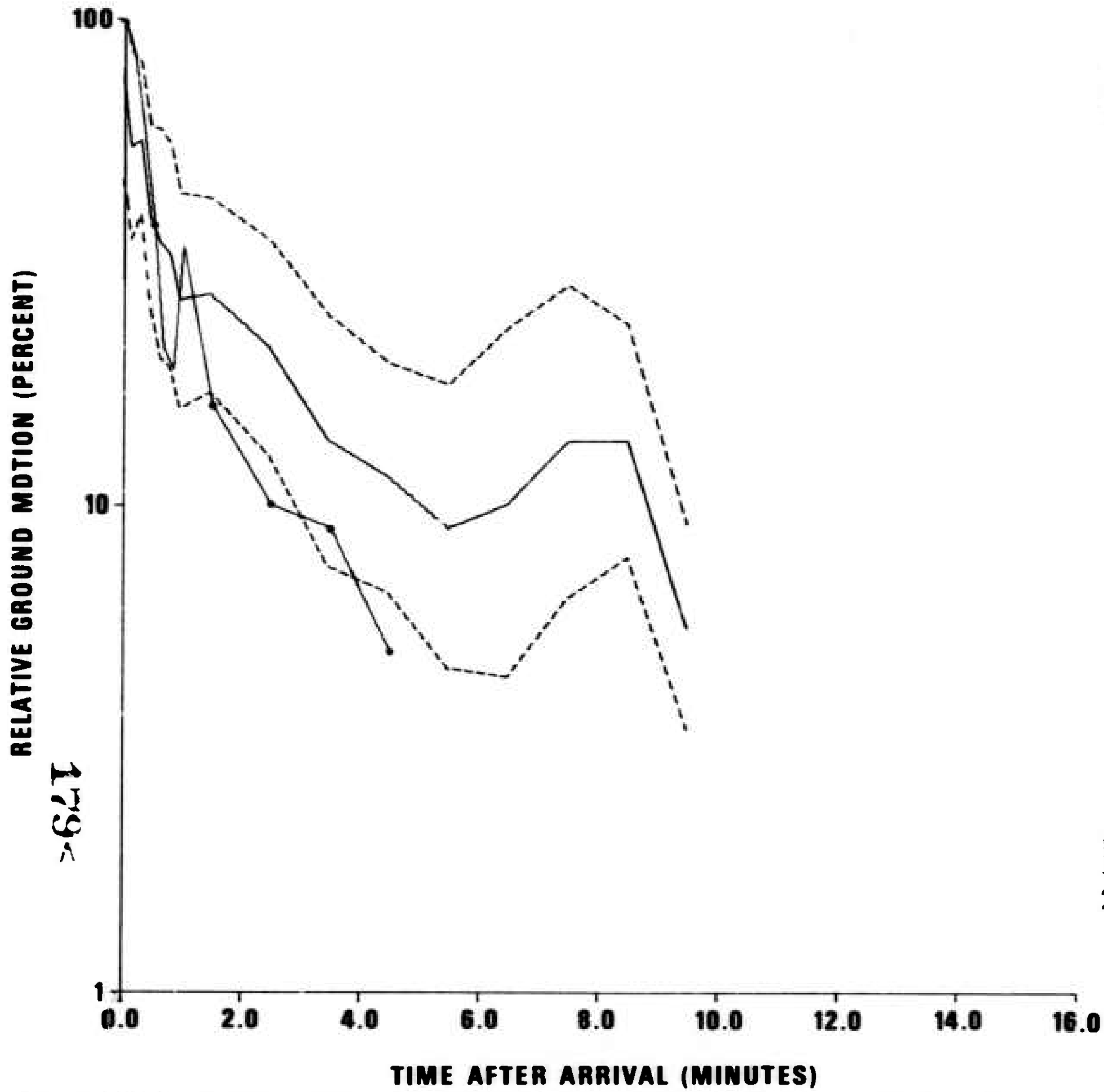
Figure AIV-29. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) CUM, 54.7°



TIME	AVG	STD DEV	OBS
0.0 S	90.	0.11	11.
10.0 S	57.	0.22	11.
20.0 S	48.	0.18	11.
30.0 S	41.	0.23	11.
40.0 S	34.	0.24	11.
50.0 S	30.	0.19	11.
1.0 M	31.	0.18	11.
1.5 M	27.	C.18	11.
2.5 M	18.	0.27	8.
3.5 M	13.	0.32	7.
4.5 M	16.	0.25	4.
5.5 M	13.	0.37	3.
6.5 M	11.	0.62	2.
7.5 M	26.	0.04	2.
8.5 M	10.	0.0	1.
9.5 M	8.	0.0	1.
10.5 M	4.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	40.
20.0 S	55.
30.0 S	40.
40.0 S	45.
50.0 S	30.
1.0 M	25.
1.5 M	25.
2.5 M	15.
3.5 M	3.

Figure AIV-30. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) KTG, 60.0°



TIME	AVG	STD DEV	OBS
0.0 S	83.	0.16	21.
10.0 S	56.	0.20	21.
20.0 S	58.	0.16	21.
30.0 S	40.	0.19	21.
40.0 S	35.	0.24	21.
50.0 S	33.	0.23	21.
1.0 M	27.	0.22	21.
1.5 M	28.	0.20	21.
2.5 M	22.	0.22	20.
3.5 M	14.	0.26	17.
4.5 M	12.	0.23	12.
5.5 M	10.	0.29	9.
6.5 M	11.	0.36	5.
7.5 M	14.	0.32	4.
8.5 M	14.	0.24	4.
9.5 M	6.	0.21	2.

TIME	AVG
0.0 S	100.
10.0 S	85.
20.0 S	60.
30.0 S	39.
40.0 S	21.
50.0 S	19.
1.0 M	34.
1.5 M	16.
2.5 M	10.
3.5 M	9.
4.5 M	5.

Figure AIV-31. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) ARE, 67.5°

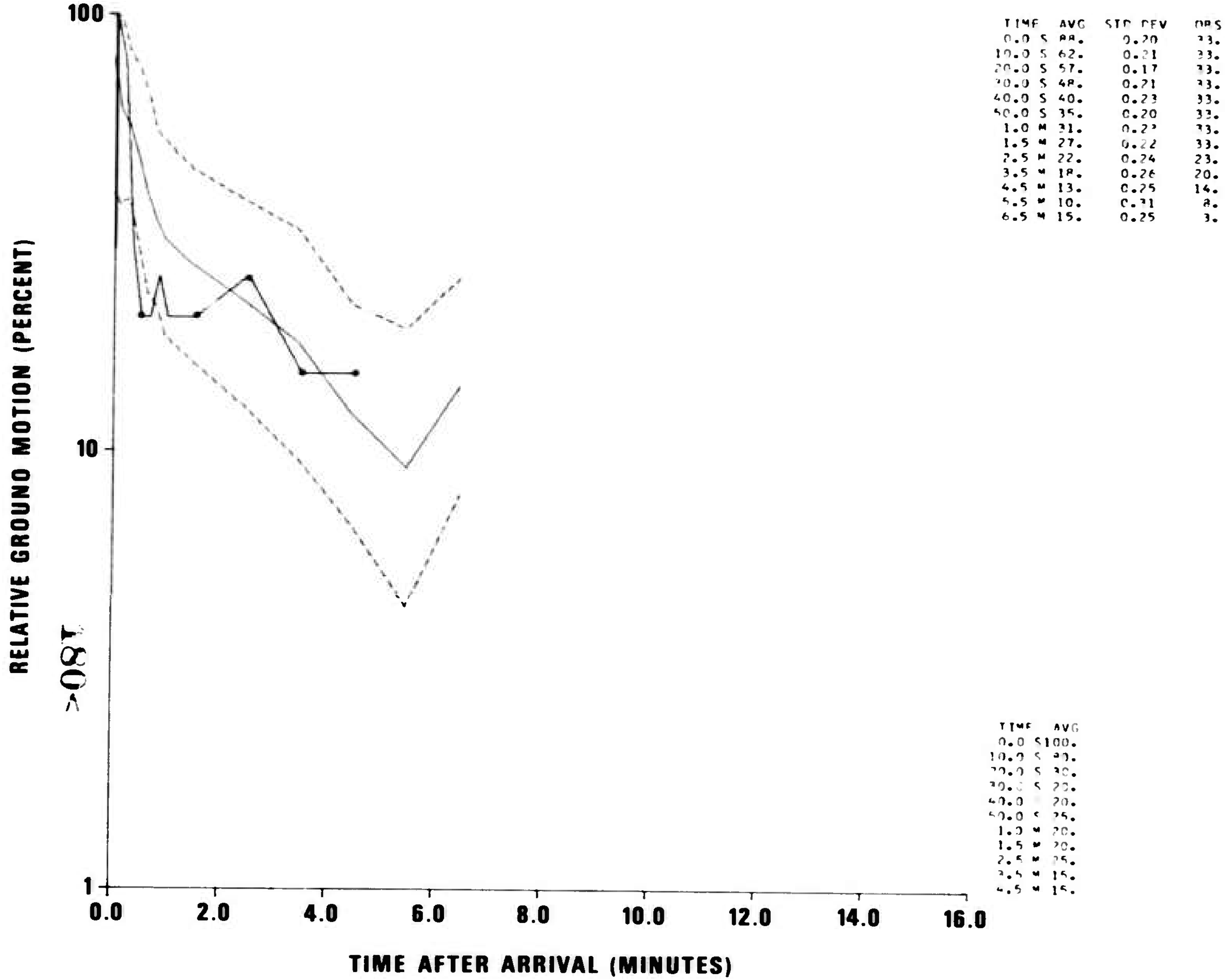
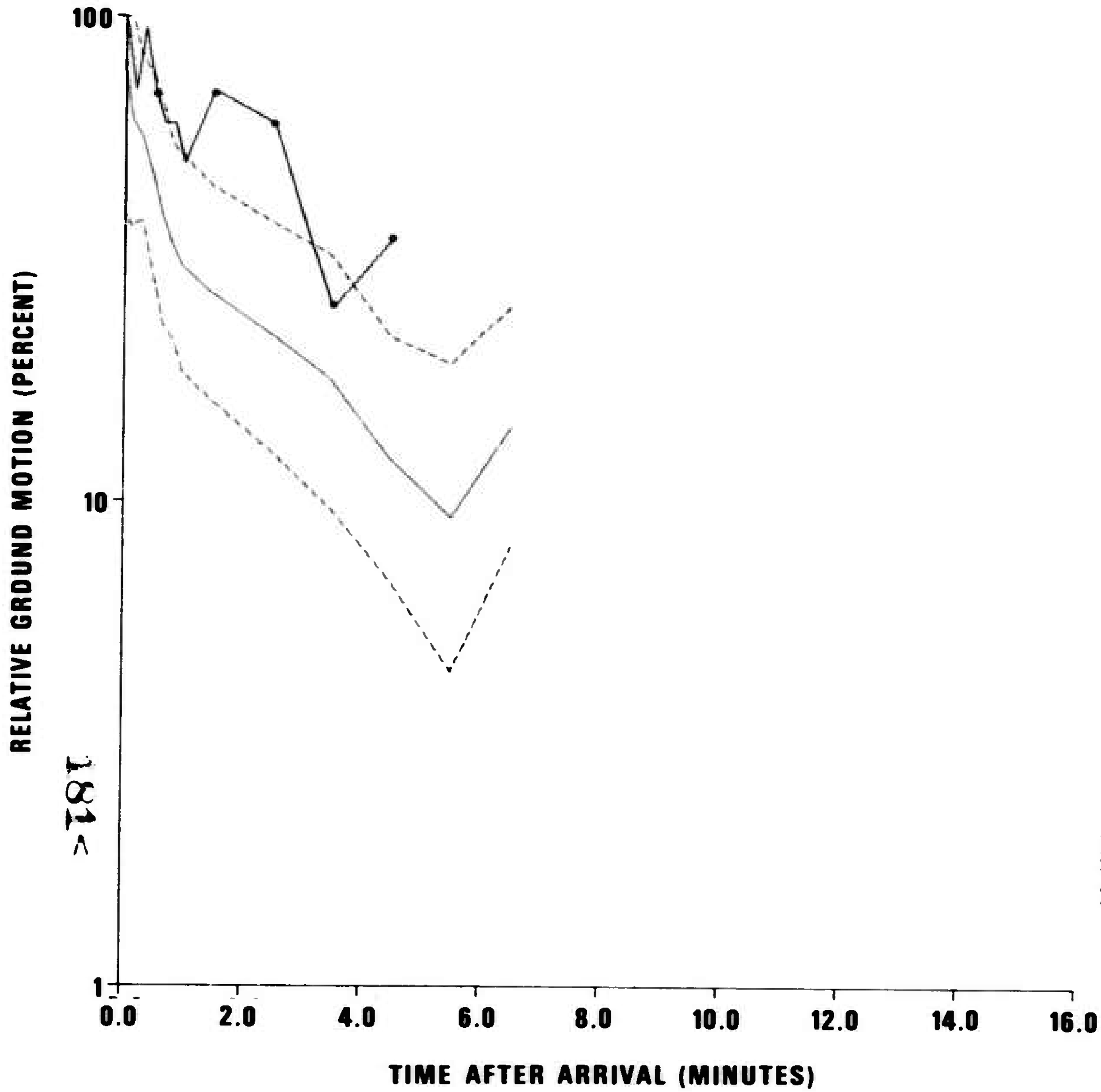


Figure AIV-32. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) KEV, 73.0°



TIME	AVG	STD DEV	OBS
0.0 S	88.	0.20	33.
10.0 S	62.	0.21	33.
20.0 S	57.	0.17	33.
30.0 S	48.	0.21	33.
40.0 S	40.	0.23	33.
50.0 S	35.	0.20	33.
1.0 M	31.	0.23	33.
1.5 M	27.	0.22	33.
2.5 M	22.	0.24	23.
3.5 M	18.	0.26	20.
4.5 M	13.	0.25	14.
5.5 M	10.	0.31	8.
6.5 M	15.	0.25	3.

TIME	AVG
0.0 S	100.
10.0 S	70.
20.0 S	55.
30.0 S	70.
40.0 S	60.
50.0 S	60.
1.0 M	50.
1.5 M	70.
2.5 M	60.
3.5 M	25.
4.5 M	35.

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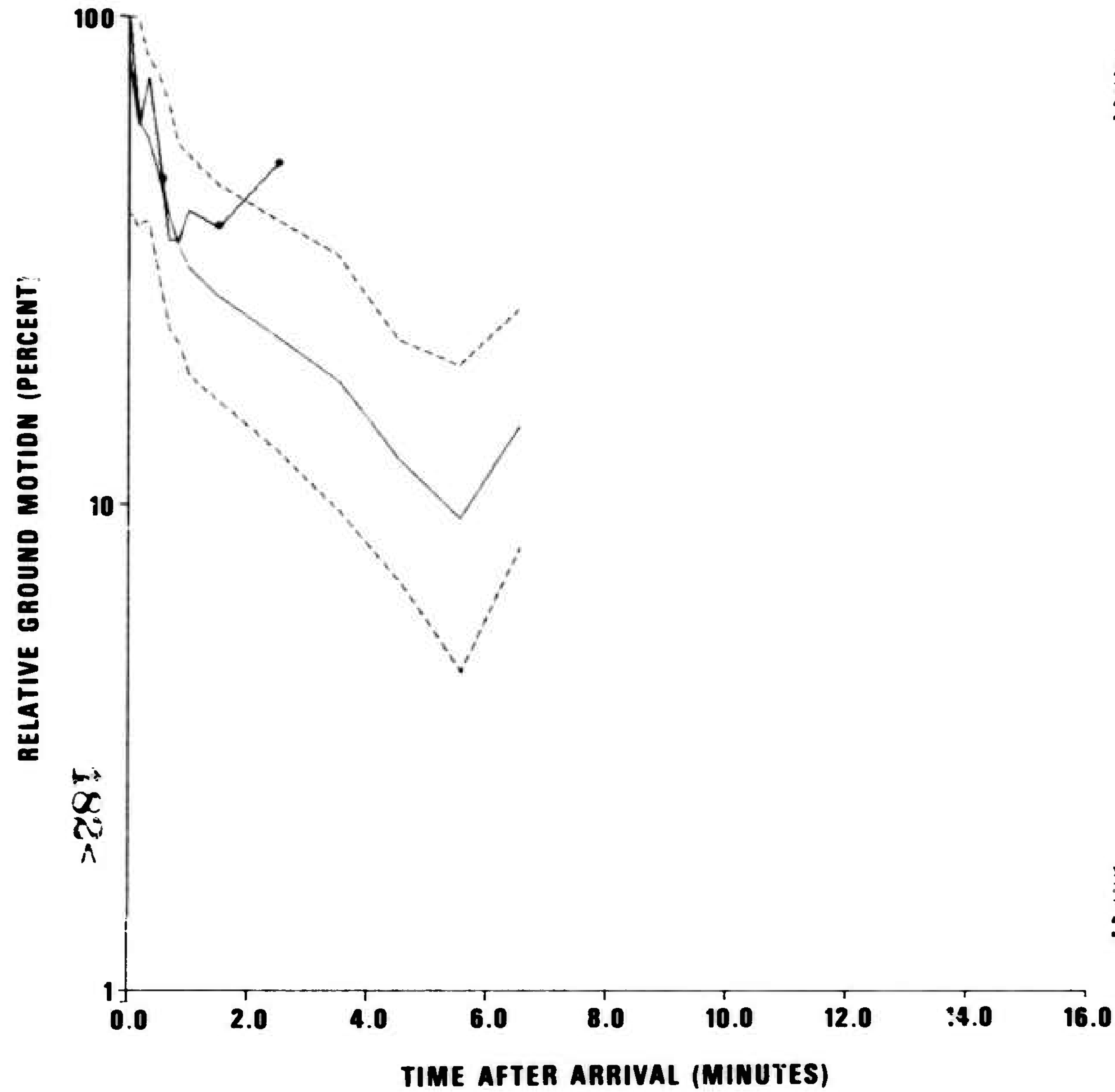
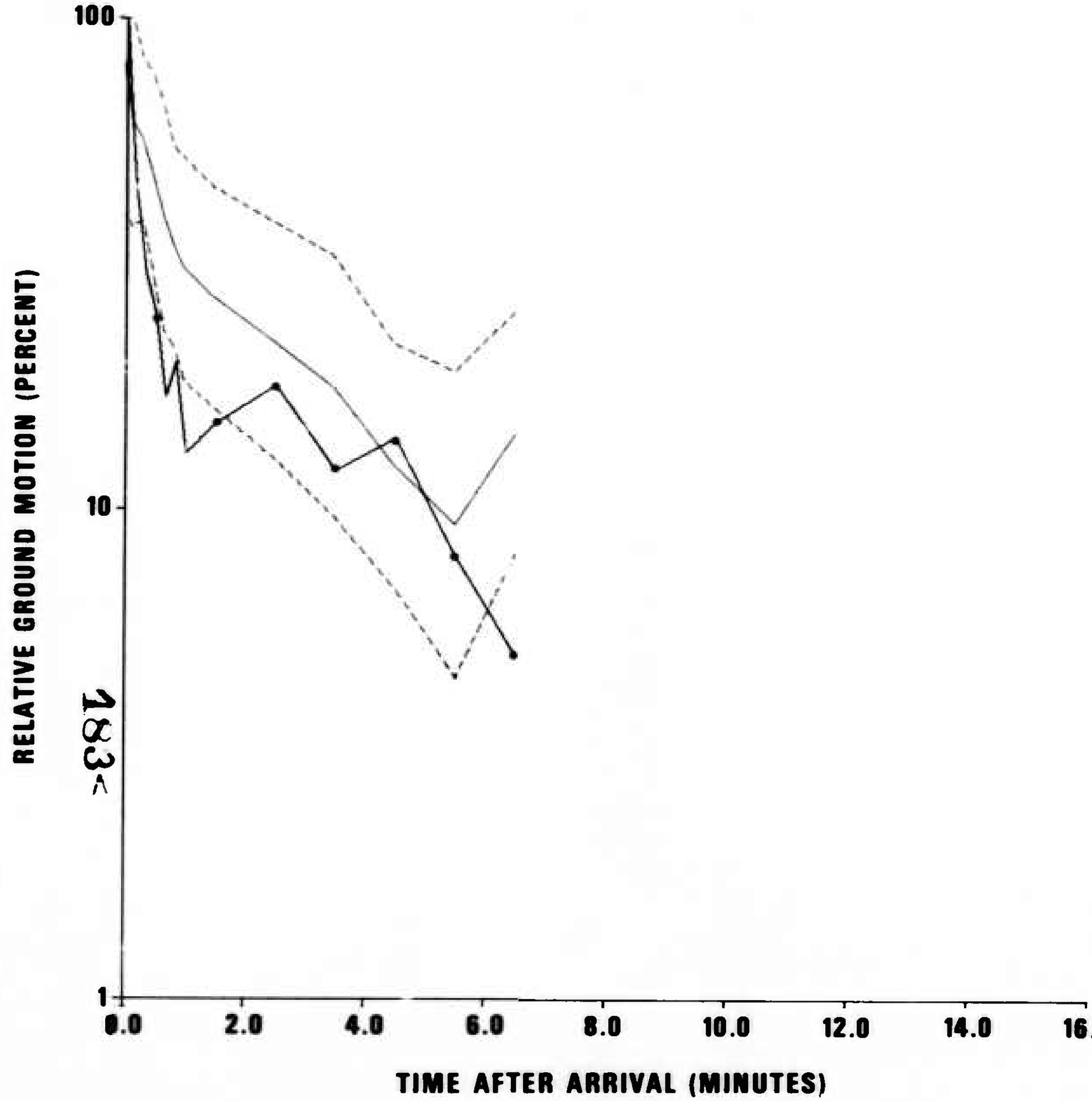
Figure AIV-33. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) VAL, 73.5°



TIME	AVG	STD DEV	OBS
0.0 S	88.	0.20	33.
10.0 S	62.	0.21	33.
20.0 S	57.	0.17	33.
30.0 S	48.	0.21	33.
40.0 S	40.	0.23	33.
50.0 S	35.	0.20	33.
1.0 M	31.	0.22	33.
1.5 M	27.	0.22	33.
2.5 M	22.	0.24	23.
3.5 M	18.	0.26	20.
4.5 M	13.	0.25	14.
5.5 M	10.	0.31	8.
6.5 M	15.	0.25	3.

TIME	AVG
0.0 S	100.
10.0 S	60.
20.0 S	75.
30.0 S	53.
40.0 S	35.
50.0 S	35.
1.0 M	40.
1.5 M	37.
2.5 M	50.

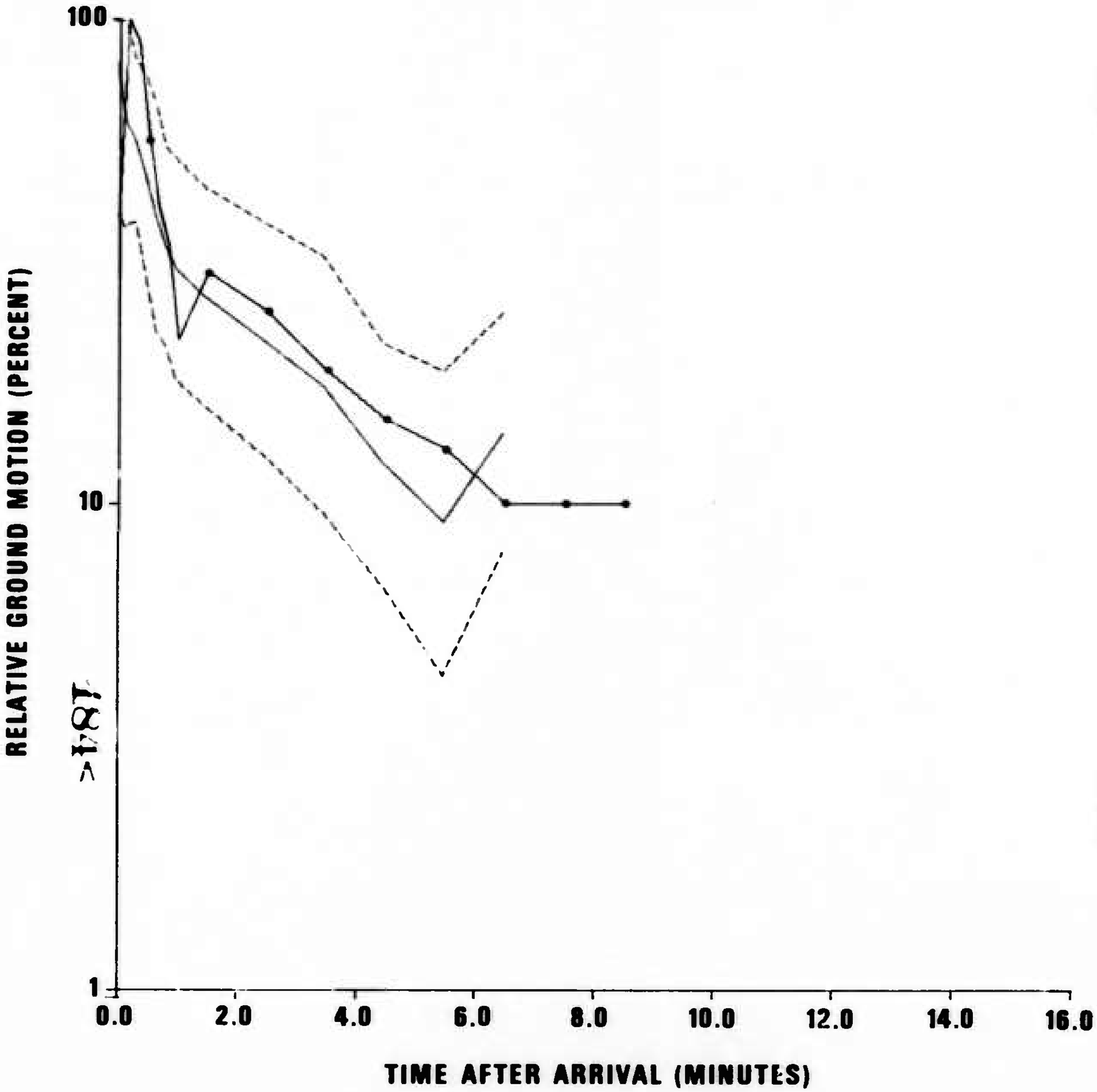
Figure AIV 34. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) ESK, 74.8°



TIME	AVG	STD DEV	OBS
0.0 S	88.	0.20	33.
10.0 S	62.	0.21	33.
20.0 S	57.	0.17	33.
30.0 S	48.	0.21	33.
40.0 S	40.	0.23	33.
50.0 S	35.	0.20	33.
1.0 M	31.	0.22	33.
1.5 M	27.	0.22	33.
2.5 M	22.	0.24	23.
3.5 M	18.	0.26	20.
4.5 M	13.	0.25	14.
5.5 M	10.	0.31	8.
6.5 M	15.	0.25	3.

TIME	AVG
0.0 S	100.
10.0 S	45.
20.0 S	30.
30.0 S	25.
40.0 S	17.
50.0 S	20.
1.0 M	13.
1.5 M	15.
2.5 M	18.
3.5 M	12.
4.5 M	14.
5.5 M	8.
6.5 M	5.

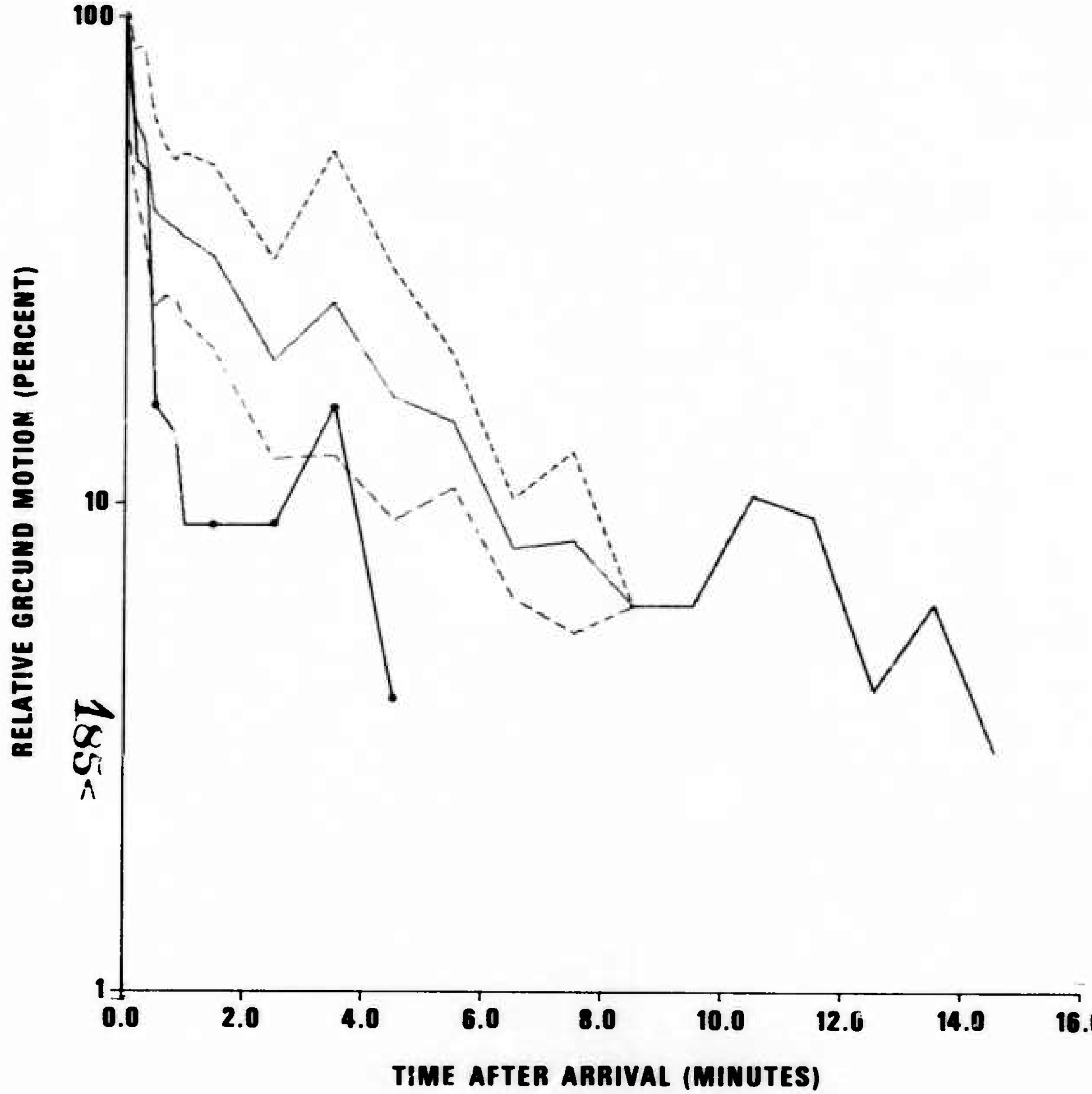
Figure AIV-35. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) SOD, 75.0°



TIME		AVG	STD DEV	OBS
0.0	S	[illegible]	0.20	33.
10.0	S	[illegible]2.	0.21	33.
20.0	S	57.	0.17	33.
30.0	S	48.	0.21	33.
40.0	S	40.	0.23	33.
50.0	S	35.	0.20	33.
1.0	M	31.	0.23	33.
1.5	M	27.	0.22	33.
2.5	M	22.	0.24	23.
3.5	M	18.	0.26	20.
4.5	M	13.	0.25	14.
5.5	M	10.	0.31	8.
6.5	M	15.	0.25	3.

TIME		AVG
0.0	S	47.
10.0	S	100.
20.0	S	90.
30.0	S	58.
40.0	S	41.
50.0	S	34.
1.0	M	22.
1.5	M	30.
2.5	M	25.
3.5	M	[illegible]
4.5	M	15.
5.5	M	13.
6.5	M	10.
7.5	M	10.
8.5	M	10.

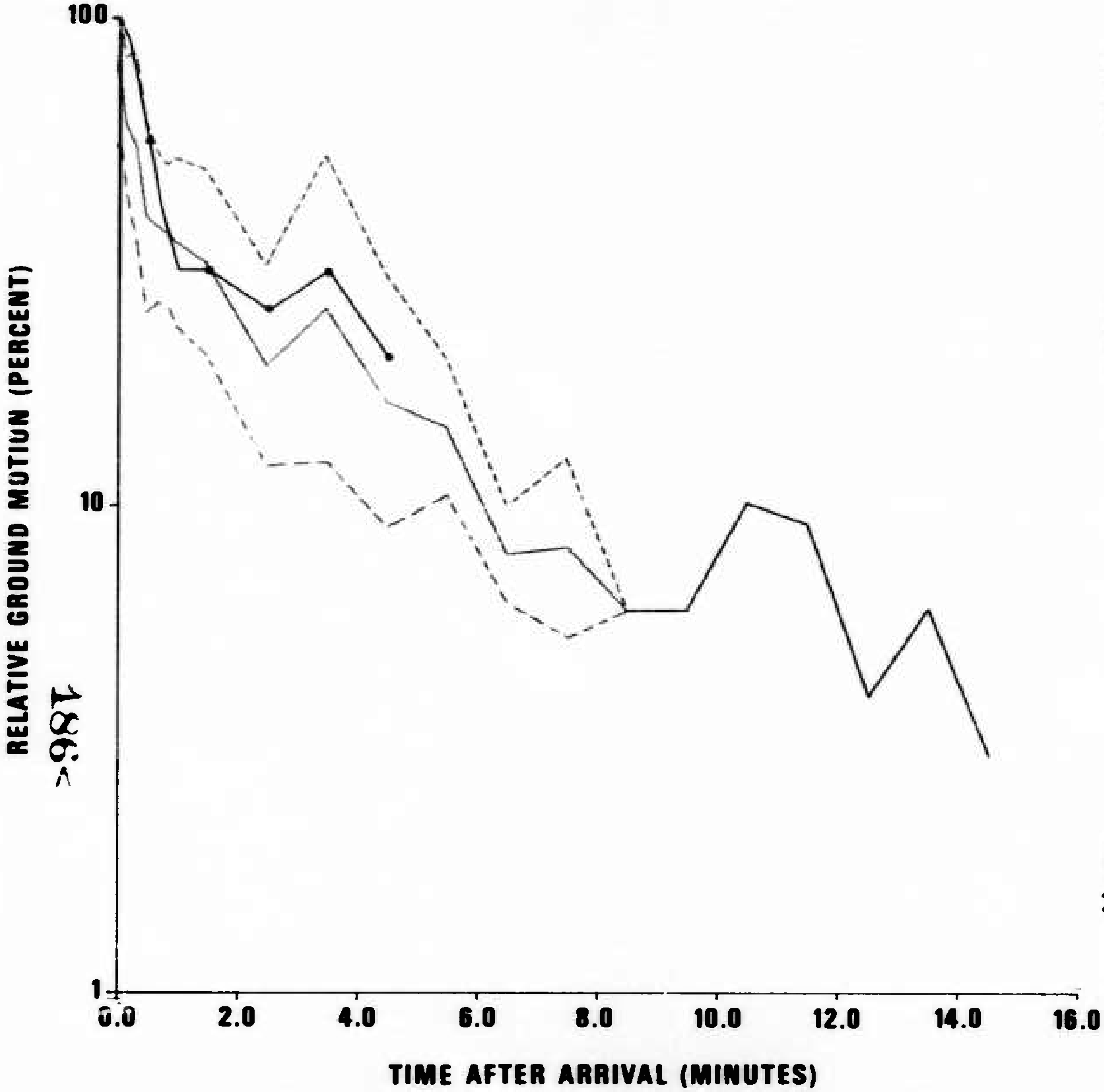
Figure AIV-36. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) KJN, 78.1°



TIME	AVG	STD DEV	OBS
0.0 S	90.	0.13	22.
10.0 S	61.	0.14	22.
20.0 S	55.	0.20	22.
30.0 S	39.	0.19	22.
40.0 S	38.	0.16	22.
50.0 S	36.	0.14	22.
1.0 M	35.	0.17	22.
1.5 M	32.	0.19	22.
2.5 M	20.	0.20	18.
3.5 M	26.	0.31	11.
4.5 M	17.	0.26	10.
5.5 M	15.	0.14	8.
6.5 M	8.	0.10	3.
7.5 M	9.	0.19	2.
8.5 M	7.	0.0	1.
9.5 M	7.	0.0	1.
10.5 M	11.	0.0	1.
11.5 M	10.	0.0	1.
12.5 M	5.	0.0	1.
13.5 M	7.	0.0	1.
14.5 M	4.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	50.
20.0 S	48.
30.0 S	16.
40.0 S	15.
50.0 S	14.
1.0 M	9.
1.5 M	9.
2.5 M	9.
3.5 M	16.
4.5 M	4.

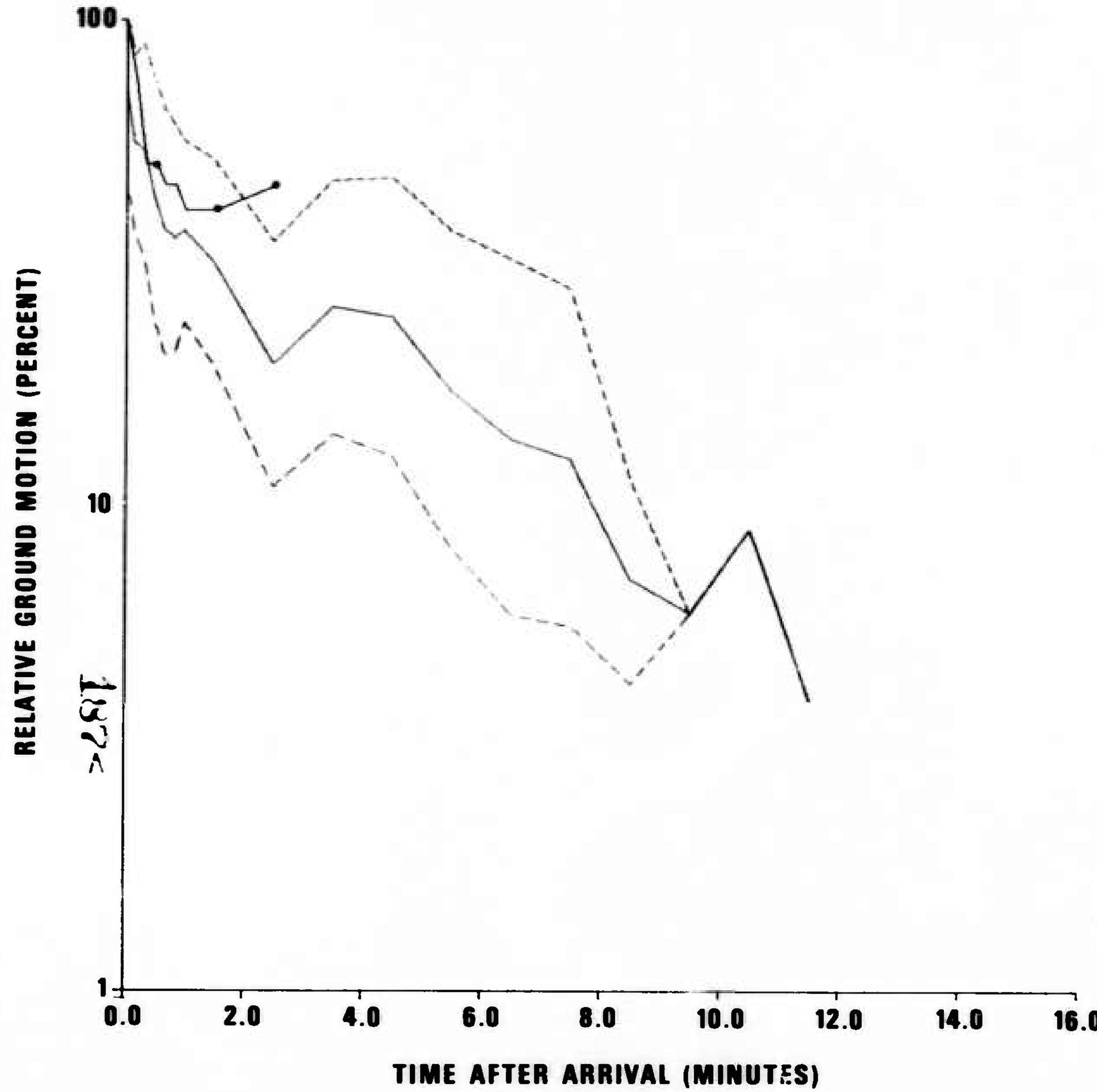
Figure AIV-37. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) NUR, 80.6°



TIME	AVG	STD DEV	OBS
0.0 S	90.	0.13	22.
10.0 S	61.	0.14	22.
20.0 S	55.	0.20	22.
30.0 S	39.	0.19	22.
40.0 S	38.	0.16	22.
50.0 S	36.	0.14	22.
1.0 M	35.	0.17	22.
1.5 M	32.	0.19	22.
2.5 M	20.	0.20	18.
3.5 M	26.	0.31	11.
4.5 M	17.	0.26	10.
5.5 M	15.	0.14	8.
6.5 M	8.	0.10	3.
7.5 M	9.	0.19	2.
8.5 M	7.	0.0	1.
9.5 M	7.	0.0	1.
10.5 M	11.	0.0	1.
11.5 M	10.	0.0	1.
12.5 M	5.	0.0	1.
13.5 M	7.	0.0	1.
14.5 M	4.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	90.
20.0 S	70.
30.0 S	55.
40.0 S	42.
50.0 S	35.
1.0 M	30.
1.5 M	30.
2.5 M	25.
3.5 M	30.
4.5 M	20.

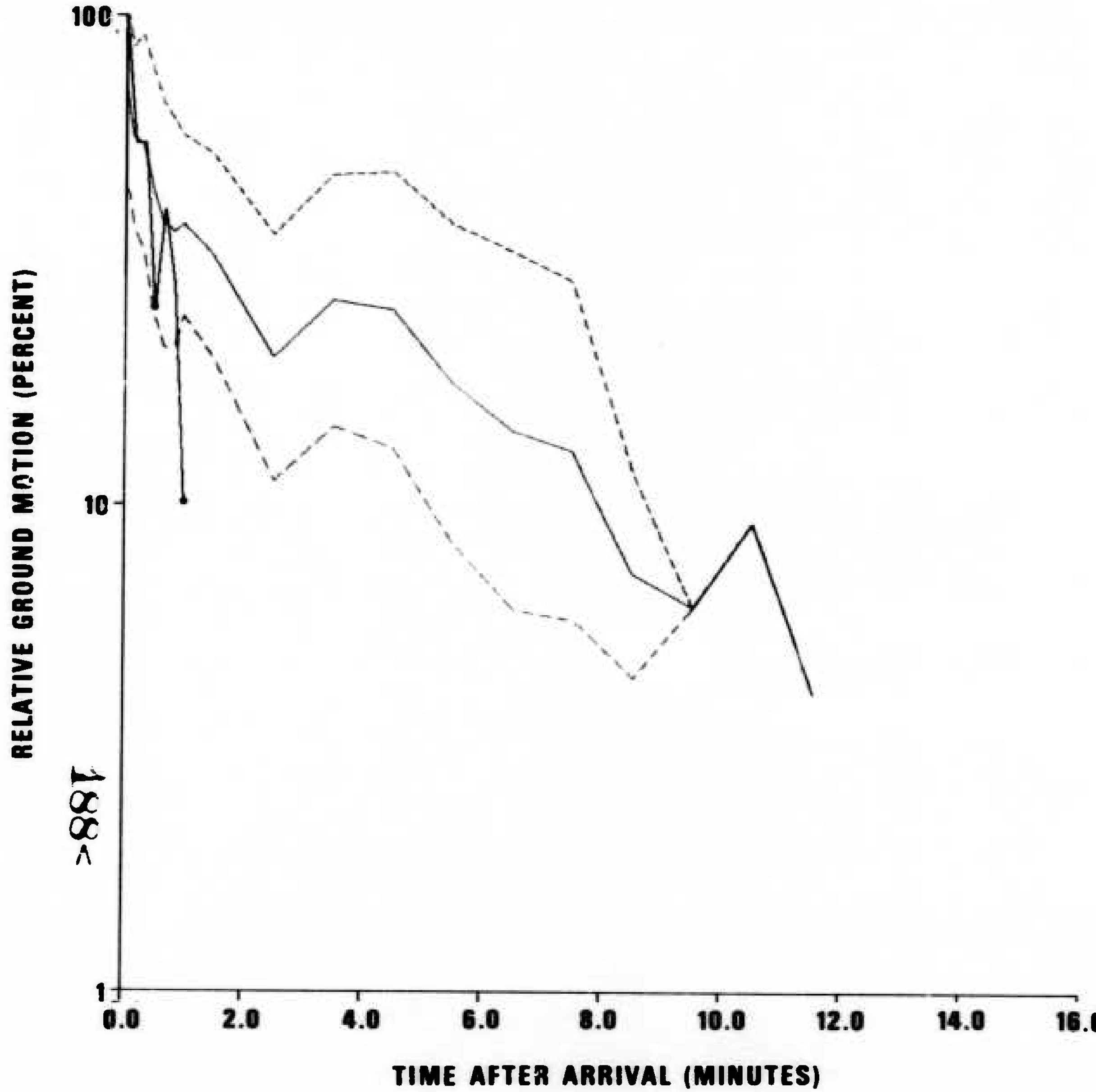
Figure AIV-38. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) PTO, 80.0°



TIME	AVG	STD DEV	OBS
0.0 S	79.	0.19	32.
10.0 S	57.	0.19	32.
20.0 S	55.	0.22	32.
30.0 S	44.	0.25	32.
40.0 S	38.	0.25	32.
50.0 S	36.	0.24	32.
1.0 M	38.	0.19	32.
1.5 M	32.	0.21	32.
2.5 M	20.	0.25	28.
3.5 M	26.	0.26	22.
4.5 M	25.	0.28	19.
5.5 M	18.	0.33	13.
6.5 M	14.	0.37	7.
7.5 M	13.	0.35	3.
8.5 M	8.	0.21	2.
9.5 M	7.	0.0	1.
10.5 M	10.	0.0	1.
11.5 M	5.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	75.
20.0 S	50.
30.0 S	50.
40.0 S	45.
50.0 S	45.
1.0 M	40.
1.5 M	40.
2.5 M	45.

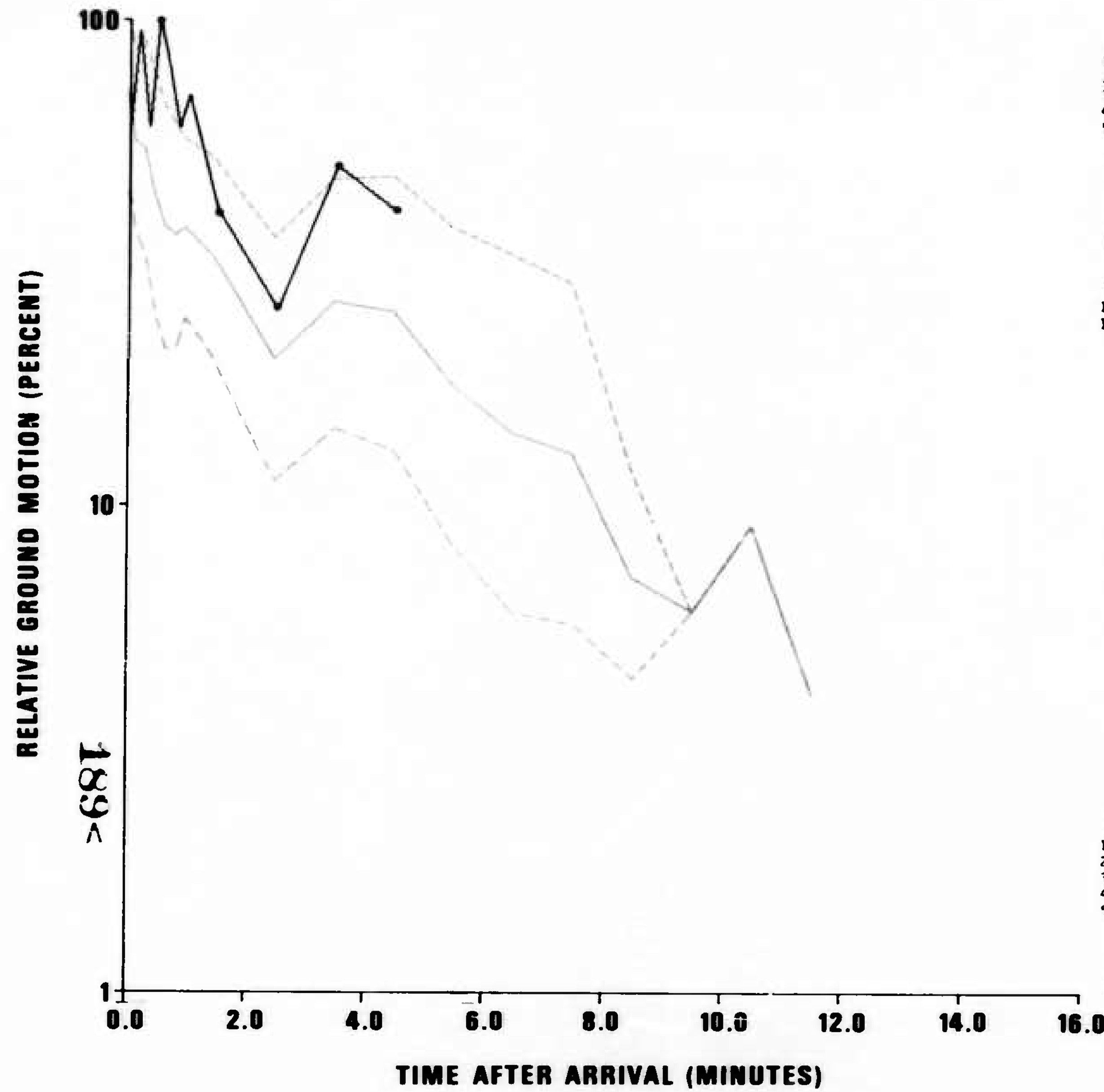
Figure AIV-39. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) GUA, 87.8°



TIME	AVG	STD DEV	OBS
0.0 S	79.	0.18	32.
10.0 S	57.	0.19	32.
20.0 S	55.	0.22	32.
30.0 S	44.	0.25	32.
40.0 S	38.	0.25	32.
50.0 S	36.	0.24	32.
1.0 M	38.	0.19	32.
1.5 M	32.	0.21	32.
2.5 M	20.	0.25	28.
3.5 M	26.	0.26	22.
4.5 M	25.	0.28	19.
5.5 M	18.	0.33	13.
6.5 M	14.	0.37	7.
7.5 M	13.	0.35	3.
8.5 M	8.	0.21	2.
9.5 M	7.	0.0	1.
10.5 M	10.	0.0	1.
11.5 M	5.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	55.
20.0 S	55.
30.0 S	25.
40.0 S	40.
50.0 S	28.
1.0 M	10.
1.5 M	10.
2.5 M	10.

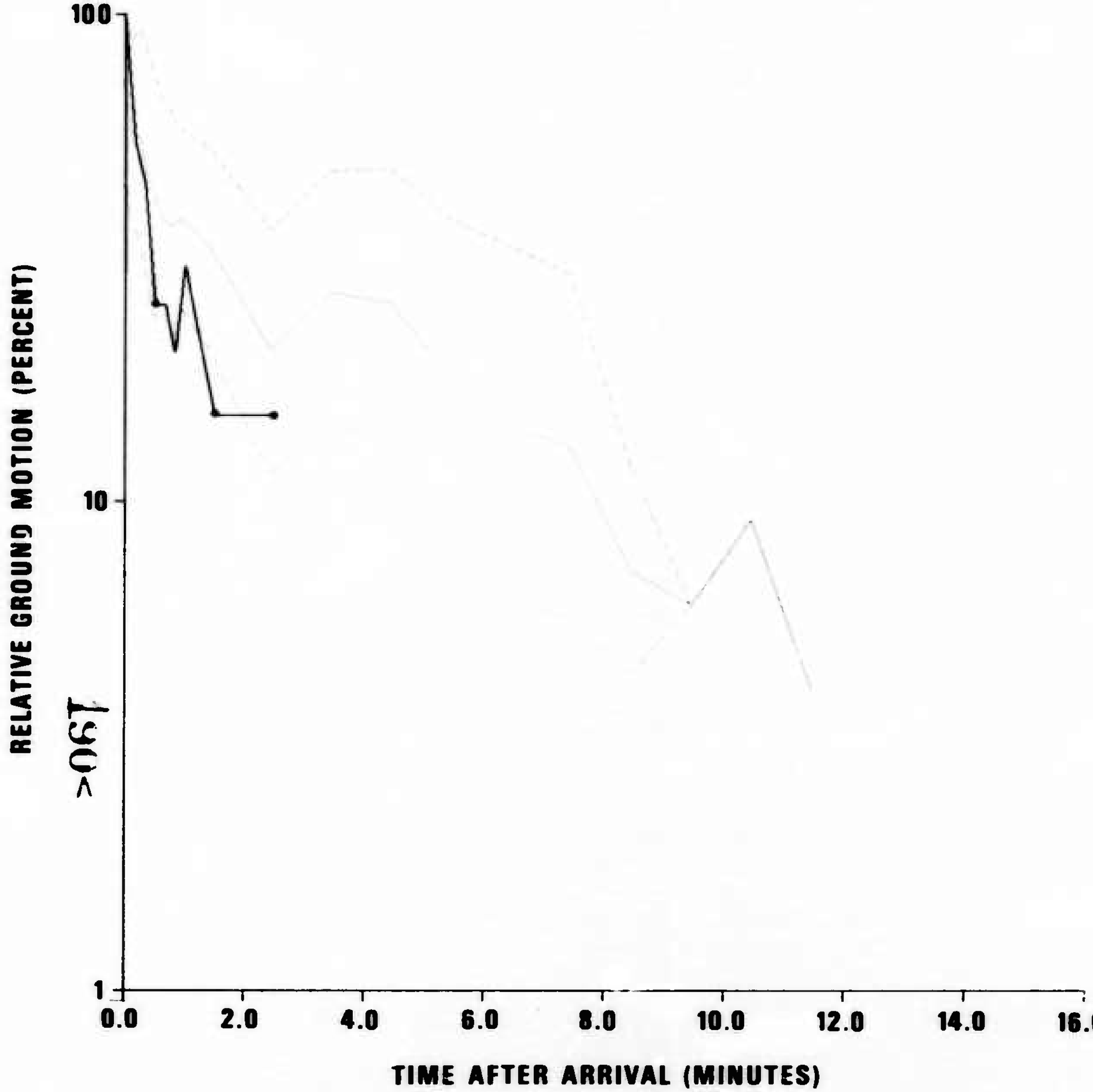
Figure AIV-40. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) KOA, 90.2°



TIME	AVG	STD DEV	OBS
0.0 S	79.	0.18	32.
10.0 S	57.	0.19	32.
20.0 S	55.	0.22	32.
30.0 S	44.	0.25	32.
40.0 S	38.	0.25	32.
50.0 S	36.	0.24	32.
1.0 M	38.	0.19	32.
1.5 M	32.	0.21	32.
2.5 M	20.	0.25	28.
3.5 M	26.	0.26	22.
4.5 M	25.	0.28	19.
5.5 M	18.	0.33	13.
6.5 M	14.	0.37	7.
7.5 M	13.	0.35	3.
8.5 M	8.	0.21	2.
9.5 M	7.	0.0	1.
10.5 M	10.	0.0	1.
11.5 M	5.	0.0	1.

TIME	AVG
0.0 S	60.
10.0 S	95.
20.0 S	60.
30.0 S	100.
40.0 S	80.
50.0 S	60.
1.0 M	70.
1.5 M	40.
2.5 M	25.
3.5 M	50.
4.5 M	40.

Figure AIV-41. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) AQU, 91.6°



TIME	AVG	STD DEV	OBS
0.0 S	79.	0.19	32.
10.0 S	57.	0.19	32.
20.0 S	55.	0.22	32.
30.0 S	44.	0.25	32.
40.0 S	38.	0.25	32.
50.0 S	36.	0.24	32.
1.0 M	38.	0.19	32.
1.5 M	32.	0.21	32.
2.5 M	20.	0.25	28.
3.5 M	26.	0.26	22.
4.5 M	25.	0.28	19.
5.5 M	16.	0.33	13.
6.5 M	14.	0.37	7.
7.5 M	13.	0.35	3.
8.5 M	8.	0.21	2.
9.5 M	7.	0.0	1.
10.5 M	10.	0.0	1.
11.5 M	5.	0.0	1.

TIME	AVG
0.0 S	100.
10.0 S	55.
20.0 S	45.
30.0 S	25.
40.0 S	25.
50.0 S	20.
1.0 M	30.
1.5 M	15.
2.5 M	15.

Figure AIV-42. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) TAV, 91.9°

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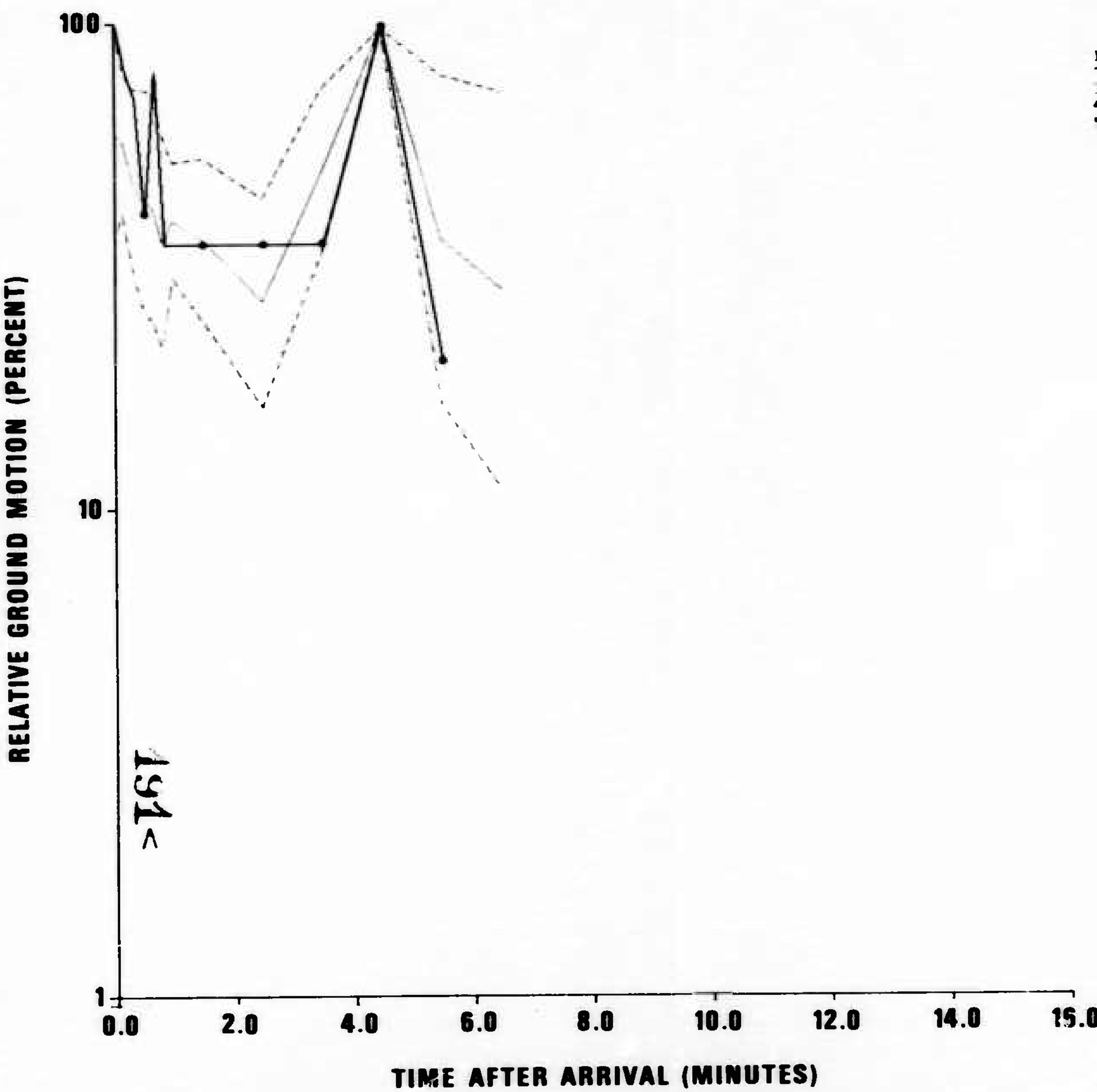

TIME	AVG	STD DEV	OBS
0.0 S	62.	0.24	6.
10.0 S	59.	0.15	6.
20.0 S	50.	0.19	6.
30.0 S	45.	0.22	6.
40.0 S	44.	0.24	6.
50.0 S	37.	0.22	6.
1.0 M	41.	0.12	6.
1.5 M	37.	0.17	6.
2.5 M	28.	0.22	4.
3.5 M	51.	0.17	4.
4.5 M	100.	0.0	3.
5.5 M	37.	0.34	3.
6.5 M	29.	0.41	3.

TIME	AVG
0.0 S	100.
10.0 S	80.
20.0 S	70.
30.0 S	40.
40.0 S	80.
50.0 S	35.
1.0 M	35.
1.5 M	35.
2.5 M	35.
3.5 M	35.
4.5 M	99.
5.5 M	20.

Figure AIV-43. Comparison of the San Fernando, California, earthquake codas (black) with the small-event coda averages (blue) PMG, 98.3°